THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LVI. No. 1424.] LONDON, AUGUST 26, 1890. [42ND YEAR. Price 6d.

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Illustrated Pamphlet and Terms on application to J. E. FISHER, Stourbridge, Agent for England and Wales; to C. M. HAMILTON, Portland Place, Hamilton, Agent for Scotland and Ireland; and for all other Countries to the Patentee,

Geo. R. HISLOP, Gas Engineer, PAISLEY, N.B.

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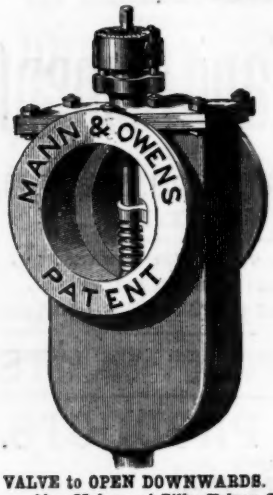
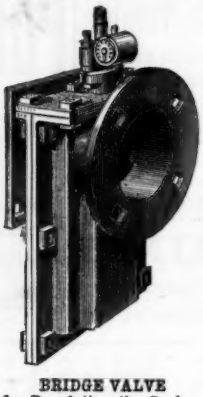


VALVE to OPEN DOWNWARDS.



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for Regulating the Seal
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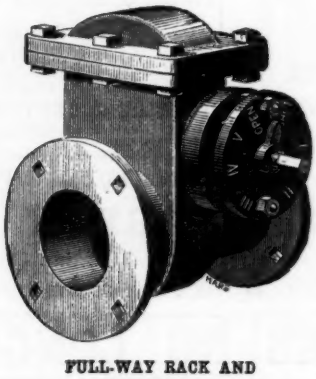

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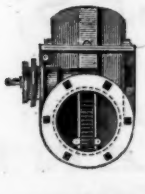

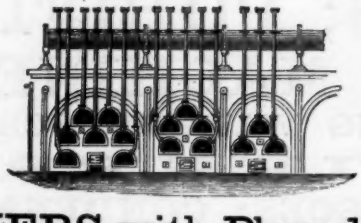

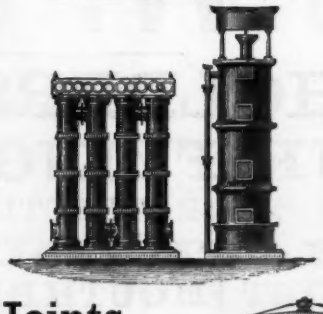

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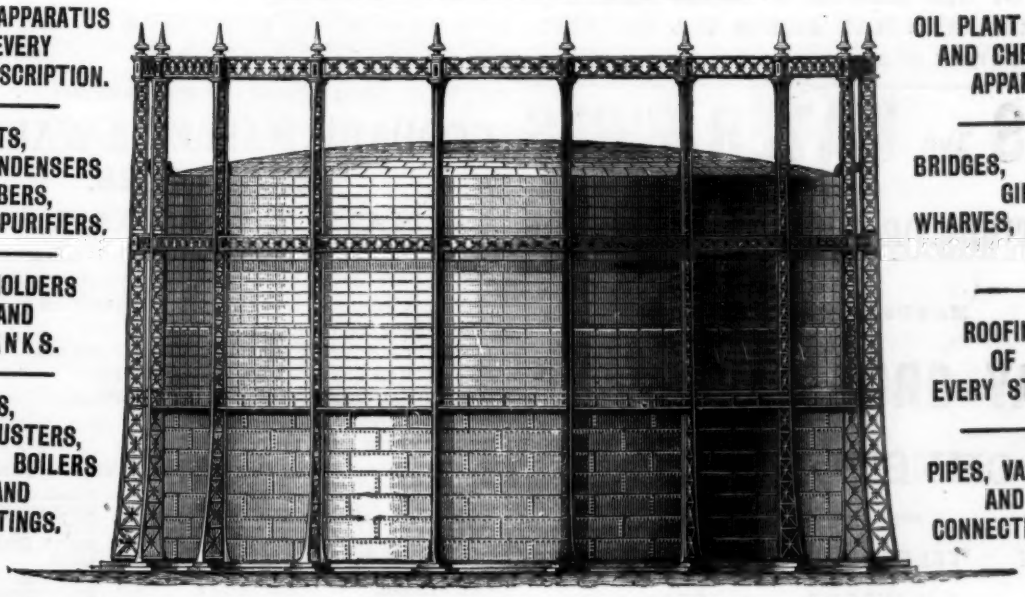

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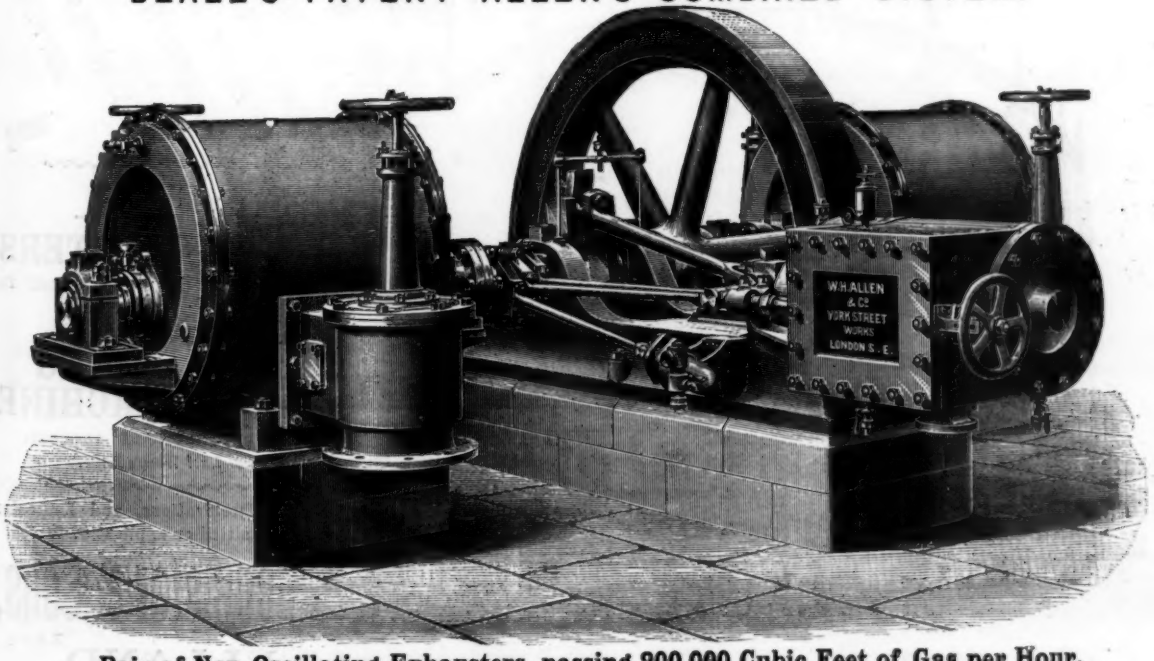

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RETORTS CAREFULLY PACKED FOR SHIPMENT.
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The most successful and approved Apparatus known up to the present time.

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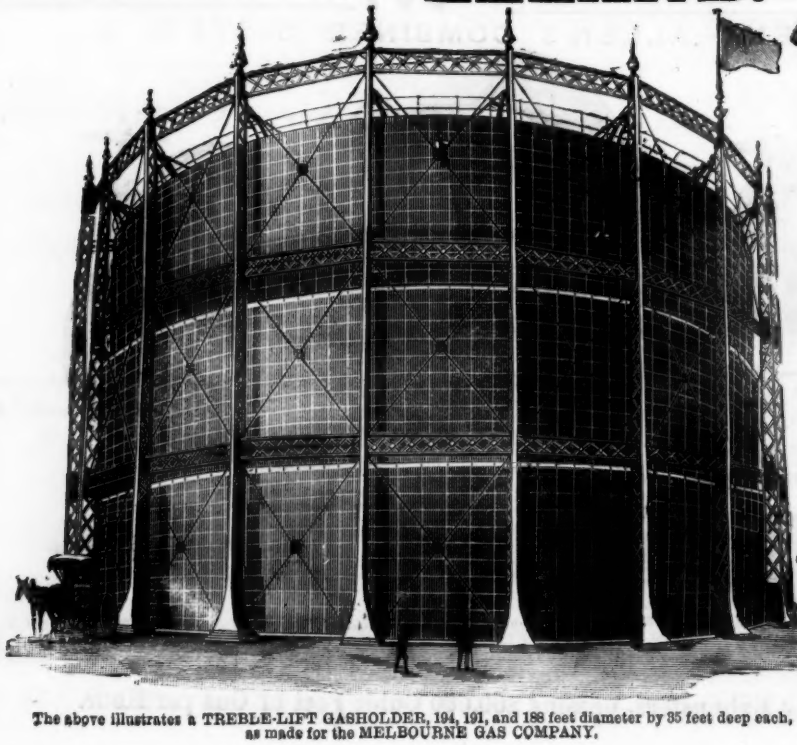

The above illustrates a TREBLE-LIFT GASHOLDER, 194, 191, and 188 feet diameter by 35 feet deep each, as made for the MELBOURNE GAS COMPANY.

GAS AND CHEMICAL PLANT OF EVERY DESCRIPTION — ALL SUNDRIES SUPPLIED.

OUR

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Are acknowledged to excel in efficiency and finish.

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FOR THE CURE OF STOPPED ASCENSION-PIPES,

A couple of charges of which will clear a stopped pipe, and an occasional charge keeps them clean, and also increases the make per ton and the illuminating power.

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PLANS and SPECIFICATIONS furnished for **Extensions** and **Enlargement** of existing **Works** adapting them to the most **Improved** and **Modern Principle** of **Gas Manufacture.**

PURIFIERS, CONDENSERS, WASHERS, ENGINES and EXHAUSTERS, STATION METERS and GOVERNORS, manufactured and erected.

Makers, by permission of that eminent authority **Mr. GEORGE LIVESEY,** of his **CELEBRATED PATENT WASHER,** highly approved by all the Engineers of Works where adopted. Largely in demand.

Special reference and attention are invited to our

WET AND DRY METERS,

which have acquired a high reputation for the **excellence** of Materials and Workmanship; their **durability** and **accuracy** of **Register** guaranteed. They are used by several of the **London Gas Companies,** and over **200 Provincial Gas Companies.**

Price Lists, Specifications, and Estimates provided for any work appertaining to Gas Lighting, from the Retort-House to the Drawing-Room.

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RIVER WATER and SEWAGE EFFLUENT successfully and economically treated in large volumes, by AGITATION WITH METALLIC IRON in

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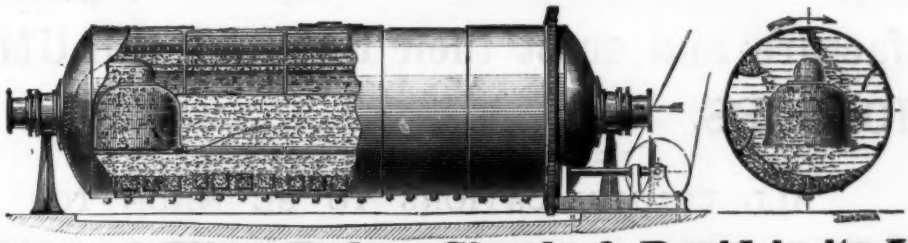

No Choking of Filter-Beds. | **Simple & Rapid in its Action.**
Colour due to Peat and Clay entirely Removed. | **Organic Matter Considerably Reduced.**

Microbes Totally Removed.

Made in Fourteen Sizes, capable of treating singly from **4000** to **1¼** Million Gallons daily.

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ALSO

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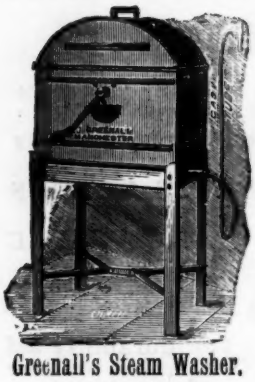

Greenall's Steam Washer.
(ORIGINAL PATENT.)

Companies desirous of extending the use of Gas should see the "GREENALL" WASHING MACHINE. The Washer is admirably adapted for domestic purposes, and will execute the work in one-third the time occupied by any other system of washing clothes, while the labour is almost nil. To Laundrymen, the Machine is invaluable.

By removing the Cylinder, the Outer Tank can be utilized for Boiling Water, or for Hams, Puddings, &c., &c., and the Burner is adapted for Heating Flat Irons.

Particulars, with Testimonials and Terms, on application to the Manufacturer,

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The Gas Washing Machine can be seen at the Royal Military Exhibition, Chelsea.

IMPORTANT ANNOUNCEMENT.

Messrs. Robert and John Dempster beg to announce that they have made arrangements with Messrs. Gadd and Mason and the Patent Gasholder Syndicate to manufacture and erect their PATENT COLUMNLESS GASHOLDERS.

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MESSRS. R. & J. DEMPSTER,

Gas Plant Works, Newton Heath, Manchester,

OR TO

THE PATENT GASHOLDER SYNDICATE,

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Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

ESTABLISHED MORE THAN A QUARTER OF A CENTURY

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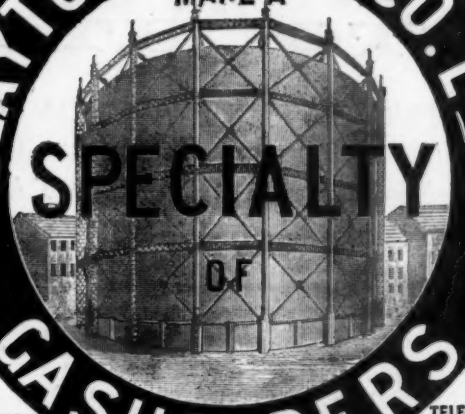

AND MAKERS OF GAS PLANT OF EVERY DESCRIPTION.

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REAL OLD SILKSTONE GAS COAL.
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Manufacturers of

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LAMP METERS.

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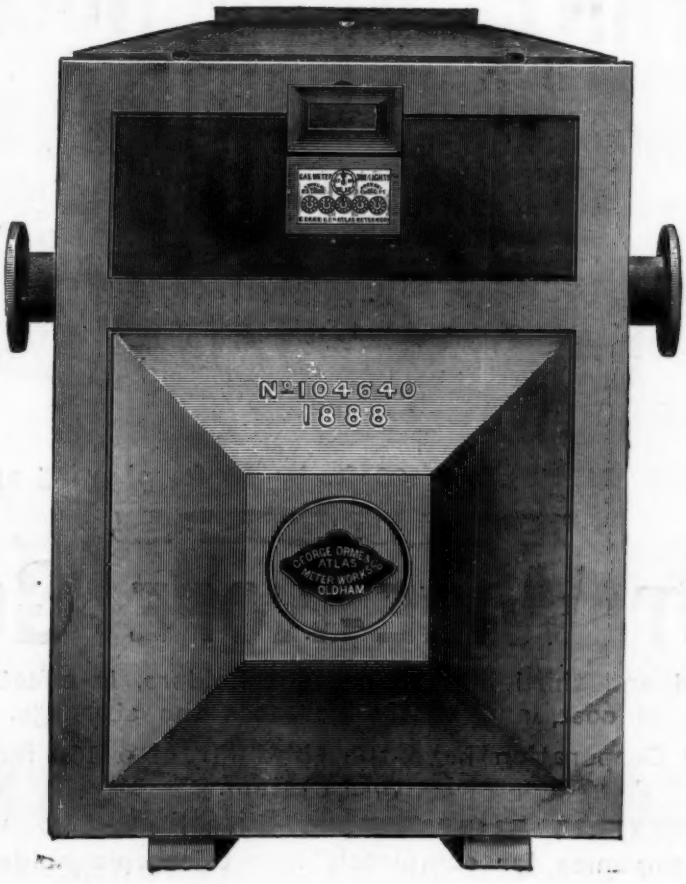
IMPROVED STREET LANTERNS of New Designs.

LAMP TORCHES.

GAS, WATER, AND STEAM FITTINGS of all kinds.



ORME'S GAS REGULATOR
(BEHL'S PATENT)
for Street Lamps.
Over 150,000 now in use.
Adopted by the Leading Gas Companies and Corporations.

ORME'S GAS REGULATOR
(BEHL'S PATENT)
for Domestic Use.

COLE'S PATENT SUSPENSION REGULATOR
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Illustrated Price Lists upon application.

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SOLE MAKERS OF

DAVIS'S PATENT AMMONIA STILLS, which are the cheapest and most effective in existence.

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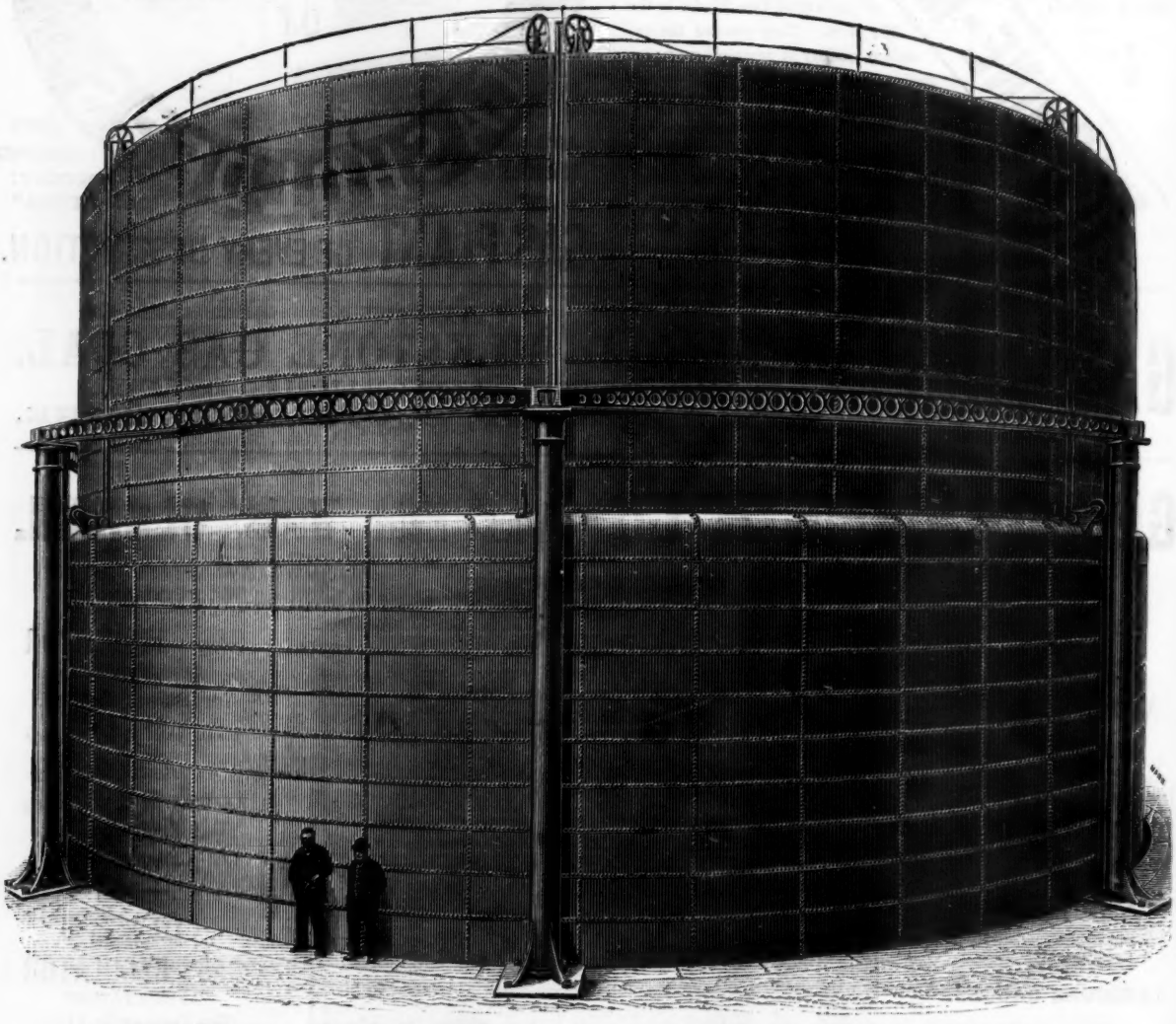


HASLINGDEN GASHOLDER, 80 ft. by 22 ft., showing application of

PEASE'S

PATENT WIRE-ROPE GUIDING.

In adding second and third lifts to present holders, it effects a great saving in cost, and vastly increases the storeage.

The Manchester Corporation have the third lift of a 100 feet holder working by this System.

PEASE'S WIRE ROPES have been also adopted by two other Companies for completely new telescopic holders.

W. & B. COWAN'S DRY METERS.

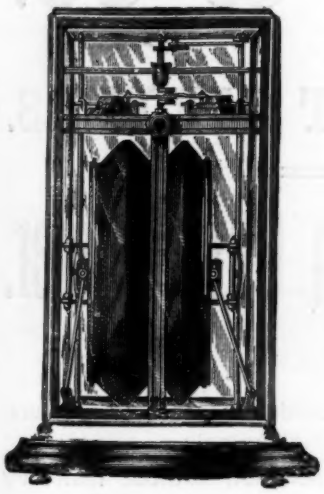
Outside Dimensions.

Size.	Depth, Back to Front.	Height, including Unions.	Width, including Unions.
Lights.	Inches.	Inches.	Inches.
2	7¼	13¾	10
3	8⅝	15	11¼
5	9½	16¾	13
10	10¾	19	15
20	13¼	24½	18½
30	16⅛	27½	21¼
50	20¼	33¼	26
60	21	33½	27
80	24¼	40½	31
100	25½	42½	33¼
150	27¾	50¾	42
200	30	56¾	42¾
250	34¼	58	46¼
300	38¼	63¼	49¼
400	41¾	72¼	56¼
500	46	74	57½

150 Lights and upwards.

Measuring Capacity.

Size.	Bore of Inlet and Outlet.	Per Revolution.	Per Hour.
Lights.	Inches.	Cub. Ft.	Cub. Ft.
2	½	0·083	12
3	⅝	0·125	18
5	¾	0·160	30
10	1	0·3	60
20	1¼	0·5	120
30	1⅜	0·830	180
50	1½	1·428	300
60	1¾	1·6	360
80	2	2·5	480
100	2	2·857	600
150	3	5·0	900
200	3½	6·6	1200
250	3½	7·3	1500
300	4	8·3	1800
400	5	12·0	2400
500	5	14·285	3000



2 to 100 Lights inclusive.

Large Stocks always Ready for Immediate Delivery or for Shipment.

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ESTABLISHED 1827

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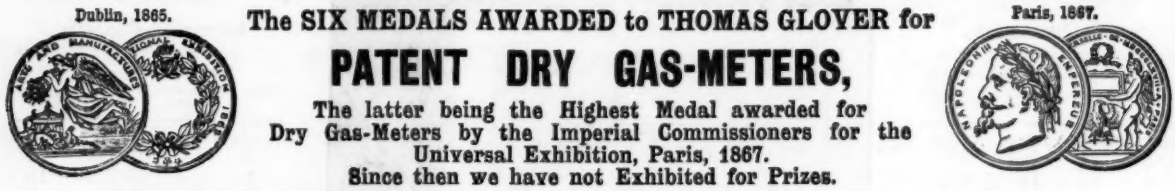
ESTABLISHED 1844.] **ORIGINAL MAKERS.** [ESTABLISHED 1844.]

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.



The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.
Since then we have not Exhibited for Prizes.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

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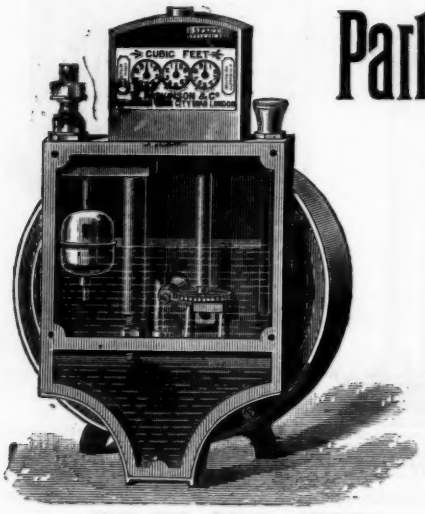

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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 26, 1890.

The South Metropolitan Company's Meeting—Presentation of the George Livesey Testimonial.

The general meeting of the South Metropolitan Gas Company on Wednesday last was, as we anticipated would be the case, of a specially interesting character. The Chairman—Mr. George Livesey—received an enthusiastic greeting from the assembled proprietors, who were evidently prepared to make the occasion a memorable one in the recollections of all present, and particularly to the man who has had the chief part in administering the affairs of the Company during the past eventful year. In commencing his speech upon the report and accounts, the Chairman, with his usual directness, proceeded to deal at once with the salient feature of the past half-year's history of the undertaking. He admitted that the report was "not "of the rosy character to which the shareholders had for "many years been accustomed." But he advised them not to be downhearted on this account; reminding them that ups and downs are incidental to all industries, and that gas undertakings are not exempt from occasional adversity. Referring to the almost forgotten times when the Metropolitan gas industry was not so settled as it has been since all the previously competing Companies were districted, and before the legislative adoption of the sliding scale, which united the interests of gas suppliers and consumers, Mr. Livesey showed that all the London Companies have passed through vicissitudes, to which the present conditions, albeit trying enough to directors and proprietors, are in comparison light. Going on to speak of the exceptional causes that have operated to alter the ordinary aspect of the South Metropolitan Company's accounts—the extra expenses incurred and the recent strike—the Chairman reminded the proprietors that these arose, wholly beyond the power of the Board, in a demand of their workmen which was universally recognized as unreasonable. It is just as well to lay stress upon this point; for the public memory is short, and there are plenty of people interested to show, in the newspapers and otherwise, that the strike, with all its consequences, was forced upon the men by the action of the Board. It is an old trick of warfare. Each party to a conflict invariably tries to fix upon the other the blame for the rupture; but luckily in the present case the record is clear. There was a supreme effort made on the part of the workmen, instigated by irresponsible agitators, to gain the control of the works of the Company. To this end, the Gas Workers', the Coal Porters', and the Seamen's and Firemen's Unions joined their forces, and declared that the Company should neither make gas nor obtain coal. This end was to have been attained by any and every means at the command of lawless demagogues working upon what they fondly imagined to be a demoralized public opinion. They reckoned without their host. Mob law has not yet been acclimatized in the latitude of London; but it cost a good deal to teach this necessary lesson. Those who remember the way in which the strike was brought about will recall the terms of the proclamations issued by the men's leaders, which declared that four days after the men turned out the works must stop, and the Directors be brought to their knees. Now the truth has been demonstrated; and the deluded strikers have learnt, to their sorrow, that neither collectively nor individually are any men indispensable. The lesson is worth the money it cost.

Mr. Livesey did not forget to acknowledge the services of the police during the Company's emergency. Leeds has since taught an astounded community that the possession of civil and military forces is not necessarily a guarantee for the preservation of order. Such forces must be properly directed if they are to have their due effect. It is not the least satisfactory feature of the suppression of the South London strike that the task was accomplished without actual fighting. Sporadic outrages occurred, of course, where small parties of strikers encountered single individuals of their opponents; but of open conflict in the streets there was none. The Directors naturally desired to make some recompense to the police for the arduous and exceptional services performed, if not exactly at their behest, still on their particular account; and the only way of doing this was to forward a handsome contribution to the charitable funds of the Force.

Leaving the subject of the strike and its consequences, Mr. Livesey went on to speak of the prospects of the Company for the coming time. He pointed out the large increase that has taken place in the price of coal, and alluded to the remarkable fact that while the cost of house coal has given way, gas coal has continued to command a high price. This shows that the gas coal "ring" has proved stronger than at one time appeared possible. The South Metropolitan contracts were not made at the top

prices; but still they show an advance of 4s. per ton on the rates ruling last year, which is a sufficiently serious matter. Mr. Livesey said that it is not the present intention of the Board to raise the price of gas; their policy being to make use of their large reserve fund for the benefit of the consumers as well as that of the proprietors. Of course, if the price of coal continues high for another season, the position will have to be reconsidered; but the Board are evidently not disposed to make the worst of the outlook. With a few remarks upon the result of the lawsuit with The Gaslight and Coke Company, and a cheerful word or two with respect to the development of the South Metropolitan consumption, Mr. Livesey brought to a close a most interesting discourse. The speech was listened to with the closest attention. Every point was fully appreciated; and the speaker was so warmly applauded, that he and his colleagues on the Board must have felt that in all their administrative acts for the past six months they had been in full accord with the shareholders.

After the ordinary meeting had terminated in the usual fashion, the presentation of the George Livesey Testimonial, the fund for which was raised in accordance with a resolution moved at the February meeting by Sir W. H. Wyatt, took place in the manner reported in another column. These proceedings were marked throughout with indescribable enthusiasm. Happily, Mr. Livesey had so far yielded to the representations of the Committee as to consent to a portion of the Fund being applied to the purchase of a portrait of himself, destined for the Board-room —a replica of the painting being at the same time prepared for Mrs. Livesey. This is as it should be; for it would have been regrettable if no presentment of the renowned Gas Engineer and Administrator had remained to recall to those who will succeed him in his own Company—at a far distant day, let us hope—what manner of man he was. The portrait is a good likeness; the artist (Mr. William M. Palin) having succeeded in catching much that is characteristic of his subject. It is unnecessary to say more here of this interesting event, the record of which speaks for itself. It is as yet undecided as to how the bulk of the Testimonial Fund is to be applied, according to Mr. Livesey's desire, for the permanent benefit of the poor of South London; but Mr. Livesey himself is inclined to think it will eventually go to "some hospital or "convalescent home work." However it is spent, good results ought to follow; for it is an expression of the unselfish admiration of a not insignificant section of the public for a man who, having found the Right, determined to uphold it through good and evil report, and made it triumph in the end. While this spirit inhabits the breasts of our countrymen, we can all afford to face the most threatening future with confidence.

The Position of The Gaslight and Coke Company.

THE position of The Gaslight and Coke Company is exercising the minds of writers in some of the too-numerous brood of so-called financial newspapers with which the City is afflicted. It is easy to see the drift of these comments, for few indeed of this order of publications are issued in the general interests. Blackmailing, as a fine art, is in many cases practised by their conductors upon new ventures, and is usually supplemented by other tricks more particularly applicable to stocks and shares of established value. It would doubtless suit the purpose of many of the enterprising proprietors of these financial journals to knock down Gaslight and Coke stock to panic values; after which they would speedily discover new beauties in the investment, and would run it up as excessively as they now seek to depreciate it unduly. To us who follow the fortunes of The Gaslight and Coke and other Gas Companies year by year, the sudden attention paid to leading gas stocks by these critics appears as unnecessary as their assumption of authority in gas matters seems grotesque. There can be no doubt, however, that these "bear" operations, conducted under the cloak of solicitude for investors, are capable of doing a vast amount of mischief, and of inflicting great uneasiness upon many innocent persons. The opinions of the *Muckraker* and other influential and widely-circulated organs of this class, are copied as "City Echoes" into a number of weekly and provincial newspapers read in all parts of the country; and, unless corrected, are then very likely to effect their object of frightening timid investors into sacrificing gas or any other descriptions of stock upon which these writers elect to make their carefully-prepared onslaughts. Thus, in the case in point of The Gaslight and Coke Company, somebody has said that, while paying 13 per cent., the concern has only earned 5 per cent. for the past half year, and that the Directors contemplate borrowing money to replace their vanished floating capital. There is, of course, just sufficient truth in these statements to give them point and plausibility; but to argue from such substratum of fact as exists for these alarmist comments, to the startling conclusion that the largest Gas Company in the world is in a bad way, is simply absurd. Doubtless, the accounts of The Gaslight and Coke Company for the past half year are not so cheering as they might have been; and we have not shrunk from pointing out features of the administration—notably the purchases of coal for the future—which have appeared in our judgment deficient in wisdom. But let these matters be as grave as they may, their effect can only be temporary; and it should be evident to anybody conversant with the true position of The Gaslight and Coke Company, that it must take more than one or two bad half years, and more than one directorial blunder, to seriously imperil the shareholders' property in this great undertaking. It is unnecessary to deal in detail with the minor criticisms, of an ostensibly technical character, which these alarmist articles of the financial press have evoked. One gentleman has written to a London evening paper to say that the only salvation of the Gas Companies is to fall into the arms of the Standard Oil Company of America, because "it has been shown "over and over again that gas made from oil, with "an admixture of hydrogen, will give a better and "cheaper light than coal gas, and costs only one-sixteenth "that of coal gas in the making." Readers of the JOURNAL, who are kept fully informed of all that can be done with oil gas and hydrogen, and all other possible substitutes for coal gas, know precisely how much value to attach to wild statements of the kind just quoted. They are in a position to ask those disposed to credit such nonsense how it is that the Samson Fox, Van Steenbergh, Stapp, and other oil and hydrogen processes which we already have among us, do not go ahead; and to treat with the contempt that it deserves the allegation that British gas makers, not being bound to any particular process, prefer to practise one that is sixteen times more costly than another equally available. The plain fact is that all these depreciations of coal gas and coal gas companies, with The Gaslight and Coke Company at their head, are idly sensational, ignorant, or interested, and should be regarded, or rather disregarded, accordingly.

The North of Ireland Association.

THE members of the North of Ireland Association have held their third annual meeting, as reported in last week's JOURNAL, at Newry, under the presidency of Mr. Andrew Gibb, of that town. We gave the presidential address in our last issue, and this week publish one of the two papers read on the occasion. The usual description of routine business was transacted—Mr. R. Ross, of Dungannon, being chosen President for the current year. A somewhat remarkable item in the proceedings was the reception and discussion of the Committee's report upon the proposal to change the name of the Association, with the object of making it embrace the whole of Ireland. In order to test the feeling of the country upon this subject, the Committee addressed 118 circulars to as many gas-works; taking in all of which they could find any record. Out of these, only 32 came back; while 22 of the others, being retained by actual members of the Association, were assumed to represent indifferent opinions. This result, as confessed by the Secretary (Mr. J. Whimster, of Armagh) and others, is most disappointing, from the evidence it supplies that hardly one in five Irish gas managers cares anything about the question of mutual association for technical purposes, and the increase of good fellowship in a necessarily isolated class. Evidently, Mr. Whimster and his colleagues were justified in the original instinct which warned them to restrict their organization to the northern district of the island. We are not surprised at the reluctance of the Committee to make any move in the proposed direction, seeing the utter insufficiency of the support they must have relied upon in so doing. We never countenanced the idea of establishing what was talked of as a National Association of Gas Managers for

Ireland; and we agree with the decision of the Committee not to attempt the foundation of any such society. As repeatedly pointed out in these columns, the meetings of District Associations should be essentially one-day fixtures, to which the majority at least of the members can go, and from which they can return home, without having to sleep a night away. But even with this wholesome limitation, these district meetings are apt to run to quite enough expense to those who habitually attend them; and a member who is not a regular attendant seldom gives to, or receives much help from the society. In the case of the North of Ireland Association, it may be fairly contended that its ordinary proceedings compare favourably with those of other associations of the class; but there is not enough in them to justify gas managers from all parts of the country in travelling, at considerable personal expense and loss of time, to the towns chosen for holding the meetings. Of course, if there had been anything like a genuine demand for the extension of the Association, this would have furnished a reasonable guarantee that its proceedings would have acquired additional attraction and importance; but the idea must now be abandoned. The Association will, as heretofore, welcome support from any quarter; but we cannot help thinking that the Committee have exercised a sound discretion in declining to entertain for the present any change of title which would have entailed the shifting of the meetings of the Association beyond its existing geographical range. It is at home and among friends so long as it hovers round the place of its birth; and there is every reason why it should stay at home, now that inquiry has established the probability that if it travelled it would only be to meet with cold indifference, if not actual hostility.

Erratum.—In the article on "Sliding-Scale Dividends" in the JOURNAL last week, the argument was much obscured by the accidental omission of several words from the sentence commencing in the first line on page 392. The sentence in question should have stood as follows: "If the company reduces the price by ½d. for the first half year, and increases the price by 1d. for the second half year, and repeats the operation in the following twelvemonth, it will practically have attained to a 10 per cent. dividend with a price of 3s. 1d."

Sanitary Congress and Exhibition at Brighton.—Yesterday the twelfth annual congress and exhibition, under the auspices of the Sanitary Institute, was opened at Brighton; the President being Sir J. Crawford, K.C.B., M.D. In connection with the congress there will be conferences of medical officers of health (presided over by Dr. A. Newsholme) and inspectors of nuisances. There is also a Health Exhibition, held in the Corn Exchange, the Pavilion Buildings, and Museum. The meeting extends to the end of the week.

Water-Works in Japan.—After considerable opposition in the Local Assembly, a system of water-works for the town of Nagasaki has, says *Industries*, been decided upon, and operations are in progress. The total cost is estimated at about £46,000; and the work is expected to be finished next spring. The supply is to be for 60,000 people, with a maximum average rate of 20 gallons per head per day. This allows for an extensive increase in the population, which is at present 45,000. The storeage reservoir is constructed at the junction of two valleys, 232 feet above the level of high water in the harbour; and the water will flow into the town by gravitation alone. The reservoir dam will be 55 feet high at the deepest part of the valley, 20 feet wide at the top, and about 520 feet long. The reservoir is calculated to hold 90 million gallons of water when full—equal to a reserve of 100 days' supply for the present population of the town. Close to the outer slope of the reservoir dam, three filter-beds will be constructed, rectangular in shape, and measuring 120 feet by 80 feet. The dimensions have been calculated so that two of the beds working at a time will be sufficient to filter in 24 hours the necessary quantity required for a day, with the moderate velocity of 6 inches per hour; the one in reserve being kept as a provision for sand cleansing or repairs. The service reservoir, or pure water basin, measures 150 feet by 80 feet; and, having a depth of 13 ft. 6 in., it holds about 900,000 gallons of filtered water. The distribution of the water will be by a principal main 14 inches in diameter from the service reservoir to the entrance of the town, where it will branch into two secondary mains 12 inches and 9 inches in diameter. From these again service mains of diameters varying from 8 inches to 4 inches will branch off to supply the whole of the town. The total length of the pipes is about 25 English miles. It will be difficult to resort to a universal house-to-house supply, or to avoid having recourse to the far less satisfactory plan of public stand-posts. Fire hydrants are to be placed at intervals of about 300 feet both in the Japanese town and the foreign settlement; and as the supply of water will be constant, they will be available at all times for extinguishing fires.

WATER AND SANITARY AFFAIRS.

THE Water Inquiry Committee of the London Corporation have been travelling northward during the last few days, on their official expedition in search of information respecting the water supply. On Tuesday they examined the water-works of the Manchester Corporation at Longdendale; and on the following day sat in the Mayor's Parlour at the Town Hall to receive evidence. In the course of the statements laid before them by the officials, it was acknowledged that Manchester had a high death-rate; but it was suggested that this resulted "from other "causes than the water." Manchester is not London, or the water would probably have to bear the blame. As it is, the excessive mortality shows that water is not everything, and that other causes have a potent influence on the public health. It was further stated that when the Corporation purchased the water-works, the money required for this purpose was obtained principally on loan; and it was explained that the surplus of the water-rate was "necessarily" appropriated to reduce the loan so incurred. It would thus appear that the profits on the supply do not benefit the present generation of ratepayers, except by a gradual diminution in the amount of interest to be paid on the loan; and, further, that they are not available for a reduction in the charge to the consumer. If the case be otherwise, we do not find it so stated. The large amount of storeage in the reservoirs is mentioned; but this reserve is absolutely needful "to cope with the difficulties of a dry summer," for there continues to be, as in 1887, "a possible fear "of a water famine." When the works at Thirlmere are complete, it is quite expected that there will be a supply "practically" equal to all demands. Still the prospect is a little uncertain; and Manchester, like Glasgow, may have to meet requirements far exceeding those that were anticipated. The effect of the Ship Canal has to be reckoned with; and the Engineer of the Manchester Water-Works says it is impossible to tell what the requirements will be when this undertaking is finished. We readily allow that the Manchester Corporation are deserving of great praise for their efforts to maintain a good and adequate supply; but we would observe that down to the present time, London has exhibited the advantage of fearing no "water famine." By-and-bye the strain may become greater; but the Metropolitan supply has never yet run short, or threatened to do so. On the whole, we do not know that the London Committee have gained much fresh light by their visit to Manchester. They were reminded that the Royal Commission which sat in 1866 looked upon the Thirlmere Lake as a probable source of supply for London. The Committee may have thought that Manchester had the better claim; and certainly it is to be hoped that London will never have to go so far afield for its supply of water. Having completed their investi gation at Manchester, where they were hospitably enter tained, the Committee proceeded to Glasgow. On Saturday they explored Lochs Lomond and Katrine; and yesterday visited the works which are intended to double the water supply of the city. To-day evidence is to be taken from Engineers and others. How all this will help the question of the London water supply, remains to be seen. But whatever may happen in the future with regard to this matter, the Corporation of London, as represented by their Committee, have gained precedence over the County Council in converting the water question into the occasion of a pleasant trip to the Lakes, as well as to the more distant lochs of Scotland.

There is some conflict of evidence with regard to the sewage of Hertford and the state of the River Lea. Major Lamorock Flower, the Sanitary Engineer to the Lea Conservancy, who gave very positive evidence before the Guildhall Committee as to the purity of the drinking supply furnished by the New River Company, and who stated that none of the Hertford sewage ever entered the Company's intake, has since adopted a somewhat different tone in a letter to *The Times*, published last week. In that communication, Major Flower speaks of the Hertford sewage as "an undoubted source of pollution to the "water supply." Surely there must be some slip of the pen here. When the Conservators of the Lea brought their action against the Hertford Corporation in 1884, the learned Judge who pronounced judgment said: "In this case it was not suggested that any drinking

"water was drawn from the Lea within any distance that "could possibly be affected by the effluent, even if it "at any time contained the germs of disease." The Judge also declared: "I find that no real injury, pollution, "or nuisance has been caused by the Corporation to the "waters of the Lea." Accordingly, the action was dismissed with costs; and Major Flower laments the loss of £6000 by the Conservancy Board. But his own evidence the other day at the Guildhall inquiry, and the chemical testimony of Dr. Frankland, as well as the results obtained by Mr. Crookes and others, all go to show that the supply taken from the Lea is perfectly good. We could have understood Major Flower's statements if he had referred in his letter to the condition of "the river" as apart from the "water supply;" for in his evidence at the Guildhall he said: "The only sources of "pollution above the intakes were, in fact, the town "of Hertford and the sewage barges." At the same time he told the Corporation Committee that "the water sup-"plied by the New River Company was extremely pure; "and every precaution was taken to keep it so." In reality, Major Flower's statements before the Committee appear somewhat conflicting; and perhaps the whole question resolves itself into this—that the river suffers in some way; but the supply furnished by the New River Company, as well as by the East London, is itself pure. There is abundant evidence to prove the excellence of the supply, as Major Flower himself showed at the Corporation inquiry, saying: "He certainly could not conceive how, "in the face of the analyses made, any one could come "there to tell the Committee that the water supplied to "the City by the New River Company was bad."

A letter in *The Times* of yesterday throws suspicion on the water supply of the East London Company. But this is in direct opposition to Dr. Frankland's reports, which give that supply the credit of "a high degree of organic "purity." Perhaps in discussing this question as to the Lea and the water supply, allowance has to be made for the self-purifying power of a flowing stream. Professor V. Pettenkofer, in an address delivered a short time back at the annual meeting of the German Society of Gas and Water Engineers and Chemists, referred to the case of the Elbe, which furnishes drinkable water at Altona, although the sewage of Hamburg has been running into the river for the last forty years. Other instances of a like kind were mentioned by the Professor. On a much smaller scale of pollution, we have the case of Staines in reference to the Thames. There is no trace of the Staines sewage in the water supplied from the river. At the same time the Conservators object to the pollution proceeding from that town, in the same way as Major Flower objects to the sewage of Hertford; and the Conservators of the Thames are resolved to take legal proceedings against the offenders at Staines, unless the pollution is stopped. Another source of complaint concerning the Thames appears in a lecture lately given before the Balloon Society by Dr. R. T. Cooper; the allegation being that the Thames is gradually losing "the force and body it "possessed years ago." The watershed is not properly governed; and we are warned that, unless there is a change, the Thames will very soon "cease to be." If so, there will be an end to all further trouble as to its purity. But the drying-up of the Thames is certainly not within measurable distance in the order of time; and we must be ruled by other considerations.

"The Art of Cooking by Gas" is the title of a neatly got-up little volume by Marie Jenny Sugg, which has recently been issued by Messrs. Cassell and Co., Limited, and a copy of which has been courteously forwarded to us by the authoress. It is unpretentious in character—no attempt being made by the writer to make her work exhaustive. Her aim has simply been, as she intimates in her introductory chapter, to point out the advantages of gas as applied to the work of the kitchen, and to demonstrate its superiority for culinary purposes over all other fuel, when properly used. It is only natural that the appliances described are those with which the name of Sugg is associated; but it must be acknowledged that these have been shown to answer their purpose admirably. General directions are given for roasting, grilling, boiling, and baking; and *menus* are furnished for dinners for the four seasons, home dinners, breakfasts, and luncheons—a chapter being devoted to bread and cakes. The book is well printed, and bound in scarlet cloth with bevelled edges; and it is furnished with a good index.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 461.)

After a three weeks' Bank rate of 5 per cent., the Directors on Thursday last reduced the figure to 4 per cent. The reduction was as unexpected as the increase had been; but although it had not been discounted, it had not a very marked effect upon prices. The natural quietude of the period of the year prevented that. The Stock markets in general have not presented any feature of absorbing interest; and changes for the most part are few in number and slight in degree. The Gas department is no exception to the rule, though business has been pretty fair. Gaslight "A" has been moderately dealt in. It opened firm on Monday, and was marked once for an exceptional amount at the special price of 240; but this figure was not again attained. Still the stock kept very steady, and never fell below 238; and the advance of 1 in the quotation which was effected on Monday was maintained throughout the week. Some little business was transacted in the secured issues at about average figures. There was more activity in South Metropolitans than there was the week before; and prices were much better than the average. The speech of the Chairman at the general meeting on Wednesday has had a good effect. The Company have gone through a sore trial. It is now over; and the bill, though a very heavy one, has been paid. So with a cheerful feeling of confidence and determination to recover lost ground, the Company enter upon the future. Commercials have been altogether unnoticed. All the Suburban and Provincial undertakings bave been similarly quiescent—not a single transaction in any one of them having been recorded throughout the week. The Brighton and Hove Company's accounts for the half year show a good increase in the business, which recoups the reduction of 2d. per 1000 cubic feet off the price charged for the gas during that period, and enables the Directors to recommend the proportionate increase of ½ per cent. in the dividend. The Tottenham and Edmonton Company's accounts also exhibit a fair growth of business, which, with the aid of about £400 taken from the balance in hand, will provide for the payment of an 11½ per cent. dividend—the same as last half year. Of the Foreign companies, Imperial Continental continues in demand; and the quotation has improved 1½, with business marked more than once at 221. Oriental is ¼ better; but Bombay has receded to a similar extent. South Americans remain unchanged. There is scarcely anything to say about the Water Companies. Very limited business has been done in them; and prices were about an average—the best being given for New River.

The daily operations were: Gas opened firm on Monday. Business was mostly in Gaslight "A," South Metropolitan "B," and Imperial Continental. The former advanced 1. Prices generally were well maintained on Tuesday, except for Bombay, which fell ¼. There was rather less doing on Wednesday; but there was no falling off from the general firmness. Quotations were unchanged. Good steady business in Gaslight "A," and a tendency in Imperial Continental to go better, were the features of Thursday. Oriental rose ¼. Friday was quieter, and prices were mostly about the average; but Imperial Continental advanced 1½. Saturday's transactions showed continued firmness; and all quotations closed without further alteration.

ELECTRIC LIGHTING MEMORANDA.

The Board of Trade Regulations for Overhead Wires—Mr. C. Offor and the Lighting of the Crystal Palace District—The Regulations Affecting Applications under the Electric Lighting Acts.

As already noticed in our news columns, the Board of Trade have in the interest of public safety issued a set of regulations for the fixing of overhead electric light wires, or "aërial conductors" as the Department calls them. These regulations mostly apply to the insulation and protection of such wires, especially when these are designed to carry currents of high potential. Where they are fully carried out, such accidents as that at Brighton, when a man was killed through grasping a naked wire conveying an alternating high-pressure current, will no longer be possible; for all wires will be efficiently covered throughoutt heir entire length. As might be supposed, however, the publication of these regulations has raised a storm of protest from electric light contractors. The subject was immediately brought before the Electrical Trades Section of the London Chamber of Commerce; and after much talk about the interference of a meddlesome Government Department with trade matters which the officials could not comprehend, a protest was framed against what were considered the most vexatious portions of the regulations. The Board of Trade replied to this communication, practically refusing to alter the regulations complained of. This reply was discussed at a recent meeting of the Section; and was there adopted as a new and first-class grievance against the Department. Mr. Crompton was in the chair, and remarked that the effect of the objectionable regulations had in one case been to run up the cost of a street-lighting cable from £28 to £75 per mile. An impartial observer would not perhaps regard

this as so very dreadful a result, if at the same time the public safety was secured; but trading electricians evidently do not look at the matter in this light. One would almost think that they would prefer to run the risk of killing a man now and then, and having to pay compensation, to incurring the small additional expenses necessitated by the Board of Trade regulations. The fact appears to be that they are possessed by an overmastering desire to cheapen the first cost of their work at all hazards—as is done in America—in order that they may have the credit of a false economy. It is to be hoped however, that the Board of Trade will uphold their regulations, and decline to jeopardize life and property in order that electric light contractors may save a few pounds per mile in their cables.

Nothing has been heard of Mr. George Offor since the failure of the Colchester lighting; but like Mr. Robert Hammond, Mr. Offor is one of those energetic gentlemen who, having taken up with electric lighting, mean to stick to the business and work it for all it is worth. If they come to grief in one place, they reappear somewhere else, as though nothing particular had happened. Thus it is only part of the natural order of things electrical that, when Mr. Offor re-appeared as a speculating electrician, it should be as Managing Director of an Electric Installation and Maintenance Company, Limited, with a plan for introducing electric lighting into the Crystal Palace district. In this capacity Mr. Offor applied for a Provisional Order for the area he had chosen as his own; and he has written to *The Times* within the last few days to narrate the troubles and delays incidental to this in common with all other proceedings of the kind—and also, perhaps, to advertise to all whom it may concern that Mr. George Offor has actually succeeded in obtaining a real genuine Provisional Order. The letter does not, of course, say anything whatever about the terms on which an arrangement for carrying out the Order in question would be entertained by Mr. Offor and his friends; but unless he is particularly lucky in this part of the business, the people residing in the Crystal Palace district are likely to have to wait very much longer for their electric light than he did for his Provisional Order. We have no desire to say anything unpleasant to Mr. Offor; but it appears to us that instead of complaining of difficulty and delay, he and his by no means too well-known Company ought to think themselves very lucky to get an Order at all, and on any terms. Their application was a "sporting" one; and now it has after a fashion succeeded, it will be necessary to form a special company to work it—for it would be very surprising to learn that the existing concern, with the long name, under Mr. Offor's management, has the necessary money for the undertaking.

The Board of Trade Rules for applications for Electric Lighting Licences and Provisional Orders have been printed, and are at least clear and unmistakeable. Naturally also they excite the rage and contempt of speculative electricians, who, as the foregoing paragraphs recount, cannot brook the slightest interference with their plans and desires. The most irritating of these rules for the gentry just alluded to, are those which give certain preferences and rights to local authorities. Thus it is laid down that no application for a Licence, or for the renewal of a Licence, will be entertained, unless proof is forthcoming of the consent of every interested local authority to the proposal. Then as regards Provisional Orders, no application from private parties will be entertained without the consent of the local authorities; or, if such consent is to be dispensed with, a special request, with reasons, must be preferred to this effect. Mr. Offor professes to be wroth because the Board of Trade would not exercise this power of dispensing with the consent of the local authorities for the Crystal Palace district, which one and all objected to his proposed Order; but he omits to show why such consent should have been dispensed with in his case. Another awkward requirement for a certain order of speculating electricians is the payment, together with the application, of £50 cash "to cover ordinary expenses." Practically, the object of the Board of Trade in framing these regulations is to throw upon applicants the onus of proving their own acceptability to those who are to be their future customers and supporters. This is objected to by most speculative electricians, who usually have no local interest in the districts they seek to occupy, and regard a Provisional Order merely as a marketable commodity. They think that "first come, first served," should be the principle of the Board of Trade in this matter of Provisional Orders for lighting; but in holding to the right of the locality to the controlling voice in affairs of such importance, the Board of Trade can securely rest upon the general body of public opinion of the country, which is nowise disposed to see towns spoilt in order that electricians may live.

Annuity to a Water-Works Manager's Widow.—At the half-yearly meeting of the Maidstone Water Company last Thursday, an annuity of £25 was granted to the widow of Mr. Ware, the late Manager of the works.

Death of Mr. J. W. Ogden.—We regret to record the death of this gentleman (who was Gas Engineer for Messrs. R. Dempster and Sons, Limited, of Elland), which took place at the residence of his father, Mr. S. R. Ogden, at Blackburn, last Wednesday, The deceased was in his 33rd year. The cause of death was heart disease.

THE PROVINCIAL GAS MANAGER.

THERE are many positions more enviable than that of a gas manager in a small provincial community. Whether he takes service under a company or under a corporation or local board the result is apt to be much the same. In either case he is subjected to many little annoyances, in themselves frequently trivial enough, but calculated in the aggregate to make a grievous total of toil and trouble. The engineer in charge of a large and well-equipped works has difficulties which are by no means to be despised. Men, as we have lately learnt, are not always tractable; stokers will strike, and coal famines occur; consumers, alas! are hard to satisfy; and the best-laid schemes are apt to miscarry in a woful manner. Big undertakings entail corresponding responsibilities; and the man entrusted with the guidance and control of any large enterprise is assured of abundant cause of anxiety. But, after all, he is free from some of the cares which beset the path of the manager of a small country gas-works. A large and flourishing business of any description is rarely hampered by false notions of economy. The fact is rightly recognized that the way to make and to save money is to lay it out wisely and judiciously. Hence the engineer of a large works does not find it necessary to spend the summer in speculating upon the chances of his getting through the next winter without mishap, or in inventing little contrivances to make the worn-out, old-fashioned plant do duty for another year. When the dull days and long dark nights come, he can rely with comparative certainty upon the sufficiency of his manufacturing plant, and need not fear the grounding of his gasholders or the sudden extinguishing of all the lights in his district. With many provincial managers the case is different. They are happy if the various departments of their works are in any degree capable of responding to the demands made upon them. It would not be difficult to point to towns where the solitary retort-house affords barely space enough for the necessary benches; where the purifiers (put in when the works were built half a century ago) are wholly insufficient to deal with the present make, and where the storeage is altogether out of proportion to modern needs. Under such circumstances, the lot of the manager is not to be envied. A succession of unusually dark days in midwinter fills him with despair; for as he watches the gradual diminution of his stock of gas, he realizes that all the resources at his command will be utterly inadequate to maintain even a minimum pressure in the mains when night really comes. There is said to be a manufacturing town in the North where the gas supply fails with such remarkable regularity, that the local newspapers have a head-line referring to the event constantly standing. It is in a district as liable to fogs as London itself; but the governing body of the town learns nothing from past experience, and every recurrence of the dismal plague finds the overstrained resources of the gas-works unable to keep pace with the demand for more light. Plans for new and larger works have been under consideration for a decade; successive managers have urged the necessity of enlarging the provision for storeage; but all counsel has fallen on deaf ears, and next winter will find things no better than they were last. Consumers grumble when the familiar burner temporarily ceases to yield the accustomed light; and they are compelled to make up the deficiency as best they may by the use of candles and lamps. Workpeople and manufacturers are alike aggrieved by the temporary suspension of labour in the factories of the place. Indignant letters are addressed to the local editors, and stormy scenes occur in the Council Chamber. But it is all forgotten in a day or two; and nobody seems to care about what has passed—except the gas manager who is in constant dread, so long as the winter lasts, of a repetition of the trouble. The corporation of the town is perhaps more than usually short-sighted. It declines to incur the expense of a new holder because fogs do not come on every day. Inconvenience is caused by the present arrangements; but then a gasholder would cost a lot of money, and it is not required all the year round. And so things are to go on as they are. Large and important manufactories in the district may be disorganized by forced stoppages; business arrangements of all kinds may be wholly dislocated; the gas manager may be unnecessarily worried; and the expansion of the business of his department checked and hindered. Nevertheless the corporation remains contented; and the holder has yet to be ordered.

But this is by no means the only nor the worst trial of a provincial gas manager. There are many men who would be content if they had nothing more to trouble them than the want of the necessary appliances for the comfortable and regular performance of their duties. Some have to endure much from those who are temporarily placed in the position of their employers. Everybody knows the man who, "dressed in a little brief authority," has the happy knack of making things uncomfortable for all around him. He is to be found in every community. Brusque, impetuous, ambitious, and noisily self-assertive, he gets into office as a member of the corporation or local board, and then, unless controlled by stronger wills than his own, assumes a dogmatic and offensive tone, and displays equal readiness to teach the gas manager the art of making gas as the surveyor that of mending roads. As a friend, he is an unmitigated nuisance; while as an enemy, he is dangerous and not lightly to be crossed. Unfortunately, he is much more likely to be the enemy than friend of any public servant who conscientiously strives to do his duty. For

your local patriot, the ardent democrat and friend of the masses, usually has his own little "axe to grind." Anxious as he is to safeguard the interests of his constituents, he seldom loses sight of the fact that he has interests peculiar to himself which are of far greater importance. If he owns property, he wants the street in which it is situated to be better lighted and better paved and cared for than any other. If he has relatives, he is ever on the watch to find them public appointments, or to put a little business within their reach. So long as he succeeds in having his own way in such matters, he is as mild as a sucking dove, and his good friends the public officials are only a little less perfect than angels. But it occasionally happens that his demands are too exacting and his wants too large to be complied with. A change then comes over the hitherto blissful scene; and the official who has dared to have a will of his own is caused to feel that he has made a foe of his once very good friend. Little difficulties of an unexpected nature spring up in his path; fault is found with arrangements which have previously been deemed entirely satisfactory; doubts are raised here, fears expressed there, until the offender is made to realize that he is living in an atmosphere of wholly unmerited suspicion, and must either resign or live on in perpetual dread of dismissal. Troubles of this kind press with double weight upon the men in the smaller districts who hold dual appointments. He who is at once gas manager and clerk to a local board, or combines the duties of gas manager and surveyor, has many more points of contact with these self-seekers than any who occupies but one post. The opportunities for differences of opinion are thus multiplied, and the difficulty of avoiding some cause of quarrel is increased. Take the case of a corporation, situated—well, never mind where. The gas manager is the servant of the town council, and discharges also (let us say) the duties of sanitary superintendent. It is really an extensive and populous district, with gas-works requiring an average amount of attention and supervision, and with an abundance of work in the sanitary department. Some time ago, indeed, the Local Authority deemed the duties of the latter position important enough to require a special and well-paid officer to discharge them. They are now combined with the duties of the gas manager, who has the satisfaction of doing double work at the original remuneration, and without assistance of the slightest character. The economical gentlemen who manage the affairs of this little Utopia have, indeed, cut matters so very fine that there is not even a clerk to copy a letter or a boy to take it to the post when written and copied. Matters nevertheless went along pretty smoothly until it happened that the views of the sanitary superintendent with regard to certain improvements clashed with those of a member of the corporation who had an interest in the property needing reform. Since then, neither the gas manager nor the sanitary superintendent has done right; and it is possible that the ratepayers of that district may lose an able, conscientious, and hard-working servant, and that he may be driven against his will to resign a position to which, in spite of the hard work, he had become attached.

Mention might be made of other troubles which fall to the lot of the provincial manager. One, shared by his "big brother," is that of being roundly abused for having the temerity to resist the demands made from time to time by the self-elected leaders of the workmen. This is by no means a serious matter, for strong language, or even bad language, does not hurt, though it is not perhaps altogether pleasant for a man to know that his actions are being misrepresented, and himself and all his relatives held up to public scorn and contempt in the little local market-place. The chief trouble in such cases arises from the fear that the directors or the committee may not stand by the servant who is fighting their battle. With members of corporations and local boards there is a strong and perhaps natural tendency to lean to what they may consider the popular side of any quarrel; and the manager is not to be envied who, in such a crisis, finds himself deserted by those who should be his warmest supporters. The difficulty a good man frequently finds in getting adequate recognition of his merit is common to all professions. The plums are few, and there are many ready to claim them. If a man is modest and retiring, he is liable to be jostled on one side by those who are more enterprising and persevering than himself; and he may grow grey and old without experiencing a feeling of the joy which comes from the consciousness that his labours have met with the reward they deserve. In some cases, even where the recognition does come, it is bestowed so niggardly, and in such a grudging spirit, that a taste of bitterness is left behind. This is frequently the case where popularly elected bodies have the control of large undertakings. Many men who fill public offices pride themselves solely on the "economy" of their administrations, and starve both the works committed to their care and the servants whom they engage. The so-called gain arising from this niggardly policy is, as we have frequently pointed out, more than counterbalanced by loss in other directions. But they cannot be induced to see it; and the starvation process is likely to exist to the end of time. It is, however, hard on a class of men who, by education and training, are often qualified for better things, and on whom the slightest departure from the path of rectitude is visited with terrible effect. A little more generosity and a somewhat broader view of all questions would vastly improve that democratic and popular government which is at once the pride and the danger of these times.

COMMUNICATED ARTICLES.

THE VALUATION OF GAS-WORKS FOR ASSESSMENT.

By Thomas Newbigging, M. Inst. C.E.

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The question of the valuation of gas-works for assessment to the poor and other purposes has been handled by different writers with great ability and at considerable length, and yet it has appeared to the writer that there is room for a further attempt dealing even more fully and specifically with the subject; and at the same time in a manner sufficiently popular to render it attractive to readers unfamiliar with the technical details of assessment for poor and other rates, but who are interested in the gas industry, whether as town authorities, or as directors, managers, or secretaries, having to do with the active administration of the affairs of the undertakings in question. The subject is especially important to the managers, secretaries, and accountants of gas-works, as it is in every sense desirable that they should have an intelligent knowledge as to whether the rateable value of their respective works is or is not assessed at a just amount.

Important as is the subject, however, there are few that are less generally understood; and consequently the determination of the rateable value of such works is left, as a general rule, in the hands of experts who have made themselves familiar with the methods of procedure, with the general bearing of the various Acts of Parliament on the subject, and (what is of equal or even greater importance) with the decisions of the Judges in cases of appeal to the higher Courts. Without the intelligent knowledge of which I have spoken, it is a thankless and ungrateful task for anyone to appeal to an Assessment Committee, even when his objections have a good and reasonable foundation. He will be perplexed with the arguments advanced against him, founded as often on ignorance as on knowledge—all the more perplexing for that reason; and the chances are that he will retire from the committee-room baffled and discomfited a sadder and scarcely a wiser man. But even when the appellant is tolerably familiar with the subject, I am bound to say, from my own observation, that it is not always economical or wise to dispense with the services of an expert, as his ripe experience and resource are of the utmost value in dealing with the intricate points which arise when the subject is under discussion either before Assessment Committees or at Special or Quarter Sessions. There is a natural tendency on the part of parochial authorities and their servants to make the most of a gas undertaking, as well as of other enterprises of a public character whereby profits are earned, and often, by rule-of-thumb, to fix the rateable value as high as possible. In many instances this policy has been carried out to such a degree that gas companies and local governing bodies owning gas-works have suffered from the injustice for years, and have at length appealed against the impost, whereby the amount of the assessment, and of course the rates, have been materially reduced.

Taxation for the relief of the poor was instituted in very early times; but it was first regulated and placed on a definite basis in Queen Elizabeth's reign. The earliest Act relating to our present poor-law system is entitled "An Act for the Relief of the Poor," passed in 1601 (43 Eliz., cap. 2). This, with but little alteration, continued to be the only Act on the subject of parochial relief down to our own times. But its provisions were long felt to be meagre and unsatisfactory. To obviate the difficulties that frequently arose, and to establish one uniform mode of rating, as well as to lessen the cost of appeal against an unfair rate, an Act was passed in the year 1836, called "The Parochial Assessment Act" (6 & 7 Will. IV., cap. 96). This, in section 1, laid down as follows the principle upon which rating should proceed:—

> No rate for the relief of the poor in England and Wales shall be allowed by any Justices, or be of any force, which shall not be made upon an estimate of the net annual value of the several hereditaments rated thereunto; that is to say, of the rent at which the same might reasonably be expected to let from year to year, free of all usual tenant's rates and taxes, and tithe commutation rent-charge, if any, and deducting therefrom the probable average annual cost of the repairs, insurance, and other expenses, if any, necessary to maintain them in a state to command such rent.

This Act did not fulfil the objects intended, as it failed to provide the machinery necessary for securing one uniform mode of rating. Accordingly, the "Union Assessment Committee Act" of 1862 (25 & 26 Vict., cap. 103) was passed. Section 15 of this Act confirms the definition given above, as follows:—

> The gross estimated rental for the purpose of the schedule to this Act shall be the rent at which the hereditament might reasonably be expected to let from year to year, free of all usual tenant's rates and taxes, and tithe commutation rent-charge, if any: Provided that nothing herein contained shall repeal or interfere with the provisions contained in the first section of the said Act (6 & 7 Will. IV., cap. 96) defining the net annual value of the hereditaments to be rated.

Hitherto the assessments in the metropolis, like those throughout the country, had been governed by the general Acts mentioned; but, owing to the peculiar circumstances of the case, it was deemed necessary or expedient that there should be a distinct Act of Parliament dealing with Metropolitan rating. Therefore in the year 1869, the "Valuation (Metropolis) Act" (32 & 33 Vict., cap. 67) was passed, in order to remedy the anomalies existing in the Metropolis in regard to the rating, by promoting

uniformity in the assessment of rateable property therein, and to provide for a common basis of value for the purposes of government and local taxation. In this Act an attempt is made for the first time to give a definition of the term "hereditament." Thus (section 4): "The term 'hereditament' means any lands, tenements, hereditaments, and property which are liable to any rate or tax in respect of which the valuation list is by this Act made conclusive." The term "gross value" is substituted for "gross estimated rental," and is thus defined: "The term, 'gross value' means the annual rent which a tenant might reasonably be expected, taking one year with another, to pay for a hereditament, if the tenant undertook to pay all usual tenant's rates and taxes and tithe commutation rent-charge, if any, and if the landlord undertook to bear the cost of the repairs and insurance, and the other expenses, if any, necessary to maintain the hereditament in a state to command that rent." The definition of "rateable value" is as follows: "The term 'rateable value' means the gross value after deducting therefrom the probable annual average cost of the repairs, insurance, and other expenses as aforesaid." These two latter definitions have the merit of greater clearness than those quoted from the previous Acts.

The third schedule to the "Valuation (Metropolis) Act" is of much interest, as giving the proportionate difference between "gross value" and "rateable value;" and as a perusal of it conduces to an understanding of the respective terms employed, it is here transcribed:

THIRD SCHEDULE.

Showing the several Classes into which the Hereditaments inserted in a Valuation List under this Act are to be Divided.

	Max. Rate of Deductions, Per Cent. or Proportion.
Class 1.—Houses and buildings, or either of them, without land other than gardens, where gross value is under £20	25 or ¼th
Class 2.—Houses and buildings without land other than gardens and pleasure-grounds valued therewith for the purpose of inhabited house duty, where the gross value is £20 and under £40.	20 or ⅕th
Class 3.—Houses and buildings without land other than gardens and pleasure-grounds valued therewith for the purpose of inhabited house duty, where the gross value is £40 or upwards.	16⅔ or ⅙th
Class 4.—Buildings without land which are not liable to inhabited house duty, and are of a gross value of £20 and under £40.	20 or ⅕th
Class 5.—Buildings without land which are not liable to inhabited house duty, and are of a gross value of £40 or upwards.	16⅔ or ⅙th
Class 6.—Land with buildings, not houses	10 or $\frac{1}{10}$th
Class 7.—Land without buildings	5 or $\frac{1}{20}$th
Class 8.—Mills and manufactories	33⅓ or ⅓rd
Class 9.—Tithes, tithe commutation rent-charge, and other payments in lieu of tithe	To be determined in each case according to the circumstances and the general principles of law.
Class 10.—Railways, canals, docks, tolls, water-works, and gas-works	
Class 11.—Rateable hereditaments not included in any of the foregoing classes	

The maximum rate of deductions prescribed in this schedule shall not apply to houses or buildings let out in separate tenements; but the rate of deductions in such cases shall be determined as in Classes 9, 10, and 11.

Section 52 of the Act provides that "the percentage or rate of deductions to be made from the gross value in calculating the rateable value for the purposes of this Act shall not exceed the amounts in the third Schedule to this Act, so far as the same are applicable." Readers will understand that these proportionate differences between the gross and rateable values apply only to the Metropolis. For the provinces, under the Union Assessment Act, the deductions are not defined; but, as a rule, they do not differ widely from the above. The Metropolitan Valuation list stands good for five years, subject to any alterations that may be made by any supplemental or provisional list in the intervals between successive revisions. The first period of five years began on the 6th of April, 1871; so that the quinquennial period for the revision of the list of the Metropolis falls in the present year ending the 5th of April, 1891.

It is by these several Acts of Parliament (with certain Amendment Acts) that the assessments of rateable property in England and Wales are governed at the present time.

(To be Continued.)

The Will of the Late Mr. H. J. Baddeley.—The will (dated March 2, 1885) of Mr. H. J. Baddeley, late of Meadow View, Sydenham, whose death was announced in the JOURNAL for the 22nd ult., was proved on the 11th inst. by Mr. H. M'Lauchlan Backler, Mr. John Blackett Gill, and the Rev. W. Lees Bell, the executors; the value of the personal estate amounting to upwards of £83,000. The testator gives his furniture and household effects and £200 to his wife, Mrs. Harriet Grace Baddeley; £100 to each of his executors; all the shares remaining unconverted which he became entitled to under a settlement by the death of his mother, and various leasehold houses at St. George-in-the-East, Bow, and Stepney, to his brother Edward; all his Metropolitan Consolidated Stock to his daughter Gertrude; £500 to the London Hospital; £500 each to his nephew and niece, Arthur Edward Baddeley and Alice Maude Baddeley; and £50 to Eliza Britten. The residue of his real and personal estate he leaves upon trust, for his wife, for life or widowhood; and, on her death or marriage again, for his daughter.

THE CHEMISTRY OF ILLUMINATING GAS.

By Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S.

XLV.

It is generally known that not only the rate of production, but also the quality of the product varies from time to time during the process of carbonization; for the most part following a descending curve from beginning to end. This point has not to my knowledge been systematically investigated; but the few experiments published on the subject go to show that some relationship prevails between the quality of the product and the rate of production. The effect of working at high heats is to increase that rate; and therefore it may be possible that the effect of the secondary action is to some extent neutralized. Although the gas is exposed to a higher temperature, in the period between its generation from the coal and its escape at the ascension pipe, this period is shortened.

If we put a charge of coal into a retort that is worked at a high heat, and carefully watch the generation of gas, the first thing observable is a low rate of production, due to the chilling action of the cold charge, which has lowered the temperature of the interior of the retort to a point below that of gasification. As the heat supplied to the exterior of the retort, and conducted through its substance to the interior, overcomes this chilling effect, the rate of production of the gas rises, and, after a time, the maximum is reached; showing that the temperature on the interior of the retort has reached the gasification point, and is causing the evolution of all gaseous matters from the coal in contact with the surface, or immediately adjacent thereto. From this we have a gradually decreasing rate, as the heat proceeds by conduction from particle to particle, to find its way into the inner parts of the charge. This goes on till the make of gas suddenly drops; showing that the whole of the charge is practically exhausted.

I wish to direct particular attention to the fact that the cessation of gas making is much more sudden and decided with high heats than with moderate heats. In the latter case, the rate of production dwindles considerably after about half the charge is worked off, and is spread out over a long time. If we wait till the evolution of gas practically ceases, the time required will perhaps be twice as long as was experienced with the high heat; although during the latter half the production may be only from 10 to 15 per cent. of the total quantity made. The cause of this is obvious. The rate of transference of heat from a hot body to a colder one varies according to the difference of temperature between the two; and with the high temperature the difference between the temperature at the interior surface of the retort, and the gasification point, may be double that obtaining at the moderate temperature. To put the case in another way, we may liken the difference to a "head" of water. The greater the head, the more rapid will be the rate of delivery; and the greater the initial temperature, the more rapid will be the spread of the gasification point from the exterior to the interior and middle portions of the charge.

If the assumption that there is a gasification-point of coal similar to the boiling-point of fluids is correct, it would follow that the gas is of one fixed quality at the moment of evolution. Any heavy vapours given off at temperatures below this point would be removed in the condenser, and would not affect our present consideration, which refers only to gases delivered into the holder after proper condensation and purification. Any variation in the quality of the product, as supplied from the holder, must therefore be due to the secondary action, which may operate in two ways, and these may be termed positive and negative. The first adds to the value of the product; the second takes away from it. The positive action converts into good permanent illuminating gas heavy vapours that would otherwise pass to the tar-well. The negative action causes the decomposition of good gas into gases of poor or absolutely no illuminating value, and the deposition of carbon.

Various theories have been put forward as a means of accounting for the deposition of carbon. Some have supposed it to consist of the carbonaceous portion of gases, the hydrogen of which has escaped through the substance of the retort. This is true to some extent, as shown by the fact that, on breaking up an old retort, the carbonaceous deposit is seen to extend right through to the outside. The known facts with regard to carbon deposit go to show that while the escape of gas through the retort may take place to some extent during the first charge or so, and again for a charge or two after each period of scurfing, the greater part of the deposit is due to the secondary action. The formation of carbon is known to be accelerated by higher heats, which could scarcely be expected to exert any influence as regards the transfusion of gas through the substance of the retort; and accumulations of carbon are apt to take place at the hottest parts, if there is any inequality in the heating. The formation of carbon is increased by an irregular placing of the charge—a cause which could scarcely have any connection with the porous nature of the retort. Increased pressure, or the jumping of the hydraulic seal, is known to facilitate the formation of carbon, and these causes may perhaps cause the escape of gas through the pores. But, on the other hand, working at a slight vacuum, under which circumstances furnace gases would be drawn in and gas could not escape, is not a preventive of carbon. In order to diminish the accumulation of this troublesome deposit as much as possible, care is taken to have equable

heating in all parts of the retort, to have the charge laid in as level as practicable, and to keep the pressure inside the retort as nearly as possible equal to that prevailing on the exterior.

The removal of carbon is attended with some expense and risk of injury to the retort; and for this reason it is desirable that the deposition should be prevented, if this can be done. But it does not necessarily follow that its formation is attended with loss. There are no means of judging whether it is a result of positive secondary action or of negative secondary action; or, assuming it to be due to both, which kind of action predominates. The rate of formation of carbon therefore does not furnish evidence, either good or bad, as to the degree of skill with which the operations are conducted. But irregular mounds of carbon in various parts of the retort show decidedly that there is something that might with advantage be remedied.

Each dimension of the retort—whether length, breadth, or depth—has its effect on the quantity and quality of the gas produced. The length is concerned not only as a factor in connection with the secondary action, but also, as regards the gas produced at the back part of the retort, on the negative secondary action. The breadth will have an important effect in determining the area of the charge that will be exposed to contact with the surface of the retort; and it is obvious that the greater the area of contact in proportion to the weight of the charge, the more rapid will be the progress of carbonization. The height is largely concerned with the thickness of the charge; and both height and breadth have some connection, taken with the bulk of the charge, in determining the extent of secondary action, by influencing the size of the space in which this secondary action goes on, and therefore the time during which the gas is exposed to that influence.

From these considerations, it follows that for every size of retort there is a certain temperature as well as a certain bulk of charge, with which the best results are obtained; and that the bulk of the charge, as compared with the cubic contents of the retort, is more intimately connected with the results obtained than the mere weight of the coal. It may here be explained that the temperature of the empty retort (which is frequently spoken of as representing the temperature of distillation) at which the gas is evolved from the coal is really a very different thing. On account of the fact that coal is purchased by the ton, it is always usual to gauge the yield of gas, and the weight of the charge, according to that quantity. The weight of the charge, however, is not necessarily an indication of bulk, which may vary according to the size of the lumps of coal or the kind of coal used. One of the advantages of charging with the scoop is that the coal is practically put in by measure rather than by weight, and a further advancement is made in this direction by West's charging machinery, whereby the coal is first broken into pieces of a moderately uniform size, and thus the proportion between weight and bulk is rendered much less liable to any important variation.

Retort-settings are costly in the first place, and there is the further expense of housing them. This has led gas engineers to consider the expediency of making as much gas as possible per retort per day; and the progress that has been made in this direction is a remarkable instance of advancement in our industry. It is not very many years since a duty of 5000 cubic feet per mouthpiece per 24 hours was considered good working; and many will be able to remember when 4000, or even 3000 cubic feet was considered satisfactory. Gas engineers in our large works, however, now talk about their 9000 and 10,000 cubic feet per mouthpiece. Some part of this increase is due to larger retorts. The general tendency at the present time is to use ⌂ retorts of 21 or 22 inches breadth; and these are gradually replacing 16-inch rounds, 18-inch rounds, ovals, and others of smaller section. But this only accounts for a small portion of the increased duty; and the bulk of it is due to higher heats, which secure more rapid and more regular generation of gas, especially as regards the latter part of the charge. Much of the gain is due to the fact, already noticed, that the high heat maintains the comparatively rapid make of gas until the last; whereas with moderate heats the make drops so gradually that it is not worth while to wait until the charge is worked off dead. Fortunately, it happens that there is a close agreement between the conditions which secure the best possibly duty from each mouthpiece per day, and those which give the best result per ton of coal carbonized.

Messrs. Folkard and Heisch, in their paper read before the Southern District Association (already referred to), give an excellent illustration of the extent to which the gas is exposed to secondary action. Practical conditions seem to render it necessary that the retort should be a long vessel as compared with its other dimensions, and that the eduction-pipe should be at one end. The result of this arrangement is that the gas at the front of the retort escapes directly into the outlet-pipe, with scarcely any exposure to secondary action, and is further protected by being hurried forward by the gas from the other parts of the charge. Compare this with the action at the extreme back of the retort. Here the gas is generated in small quantity, and therefore occupies some time in moving forward. Assuming the make to be equal in all parts of the retort, the rate of travel of the gas at the back end will be very much slower than at the front. Messrs. Folkard and Heisch illustrate this by supposing the retort to be divided into ten equal parts, and show that the average velocity will range from 0·75 inch per second in the back part, up to 8 inches per second in the front division. The acceleration of velocity is gradual, as each portion of gas is joined by that evolved from the portion in front of it; and the main result is indicated by the calculation that the gas from the back "tenth" is exposed to the heat prevailing in the open space above the charge for about 45 seconds, while that from the front division is only exposed for about 1½ seconds. This calculation is based on the average yield; and when we take into consideration the fact that the rate of evolution of gas varies, it is evident that the time of exposure to secondary action varies still more widely. What must be the period of exposure experienced by the gas evolved during the last hour of a six-hour charge, at moderate heats?

If we ask, "What is the period of exposure to secondary action that is needful for the best results?" there is very little information available on which to base an answer. Assuming that the quality of the gas as it leaves the coal is fairly uniform, it would appear that the cause of the regular decrease in quality observed during the progress of carbonization is negative secondary action, and that a considerable destruction of illuminating value takes place in the retort. It is not improbable that while a large proportion of the gas is thus "overdone," the remainder may escape in an "underdone" condition, loaded with tarry vapours, which might be converted, by secondary action of the positive kind, into gas of good quality. Two wrongs, however, do not make a right; and it is quite possible that an increase of secondary action, as practised in the Dinsmore process, might improve the ultimate result by means of increased positive secondary action, or that, on the other hand, a decrease might also prove beneficial, by reducing the objectionable negative action. The object is to produce the greatest practicable preponderance of positive secondary action; and it is obvious that this might be secured in either direction.

Mr. George Livesey's Portrait.—In view of the general recognition, on the occasion of the presentation to Mr. George Livesey last Wednesday, of the ability displayed in the production of the portrait, it may be interesting to supplement the remarks contained in our report of the proceedings (which will be found in another column) by a few particulars in regard to the artist—Mr. William M. Palin. Mr. Palin was a pupil in the Burslem School of Art, where at the age of nineteen he obtained a National Scholarship, and for two years attended the Art Schools at South Kensington. There he was regarded as such a promising student that he was employed by the Science and Art Department for a similar period in reproducing celebrated works of art in Italy—principally in Milan and in Rome. After that he studied in Paris; and he is now following the profession of a portrait painter. As stated elsewhere, he has already had several commissions for portraits of members of the Institution of Civil Engineers; among them being Sir G. B. Bruce, Sir J. Douglass, Sir Douglas Fox, Mr. J. Mansergh, and Mr. Corbet Woodall. Mr. Palin was an exhibitor at the Royal Academy in the season just closed.

Coal Production in Russia.—The *Russie Commerciale* has recently published some particulars respecting the working of the Russian coal-fields. According to this publication, the quantity of coal produced in the different countries is distributed as follows: England, 166 million tons; United States, 118 million tons; Germany, 76 million tons; France, 21 million tons; Austria-Hungary, 22 million tons; Belgium, 18 million tons; Russia, 5½ million tons; and other countries, 5 million tons. These figures show that Russia only occupies a very secondary place among coal-producing countries; and yet Russia is the richest country in coal-fields, particularly the basin of the Donetz. According to the estimates of Professor Mendelief, the surface of the ground occupied by the coal-beds in this province extends over nearly 30,000 square kilometres, or 11,580 square miles. Taking the average figure of 50 million pouds (a poud is equivalent to 36 lbs. avoirdupois) to the square kilometre, it will be found that the general yield of coal will amount to the total of 1,500,000 million pouds, or 24,000 million tons. The entire world, says Professor Mendelief, might be supplied during the next 50 years with coal from the Donetz basin. The above remarks apply only to the superficial beds. As regards the others, which are at considerable depth, and which have not yet been worked, they are said to be even of greater richness. Coal mining has received a very considerable impetus in Poland, and in the basin of the Donetz. In 1888, Poland yielded 142 million pouds; and the basin of the Donetz, 140 million (2,290,000 tons and 2,258,000 tons respectively). Although the working of coal is rapidly on the increase, the quantity extracted is not sufficient for the requirements of the country, which is obliged to have recourse to foreign importation. Notwithstanding its immense coal-fields, Russia imports annually nearly 107 million pouds of coal, of which 85 millions are supplied by England, 19 millions by Germany, and more than 2 millions by Austria-Hungary. In spite of its good qualities, Russian coal cannot compete with foreign coal, even in the southern ports, which are found in proximity to the coal-fields of Donetz. Notwithstanding the increase in the duties on importation of foreign coal at Odessa, Sebastopol, and in the other ports of the Black Sea, English coal is no dearer than Donetz coal; and far from diminishing, its importation has greatly increased of recent years,

TECHNICAL RECORD.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

Official Report of the Proceedings at the Annual Meeting at Perth.

The Twenty-ninth Annual General Meeting of the members of the North British Association of Gas Managers was held on Thursday, July 24, 1890, in the Academy, Perth—the PRESIDENT (Mr. S. Stewart, of Greenock) in the chair. There was a large attendance.

The PRESIDENT opened the proceedings by expressing his pleasure at seeing the good muster of members, and stating that telegrams had been received from Mr. G. Hislop, Mr. R. Mitchell, and others, regretting their inability to be present.

REPORT OF THE COMMITTEE.

The SECRETARY (Mr. R. S. Carlow, of Arbroath) read the annual report of the Committee, as follows:—

The Committee now present the annual report in the form agreed on at the 1885 meeting; and the following statement gives a general outline of the business done, with some notes that may be interesting.

In reference to the remit to Mr. Young along with a Special Sub-Committee, to investigate into the question of purification in closed vessels, the Committee have to state that they have been in communication with Mr. Young, and that he had stated in a letter to them that he had been so much engaged with other matters of importance, that he had not seen his way to have the ammonia purification process tested on a commercial scale, and to make any other form of trial would in his opinion have no practical value. He also stated that his present engagements would prevent him from doing anything in the matter for some considerable time to come. The Committee took Mr. Young's letter into consideration; and, after giving it full justice, resolved to relieve of their duties the Special Sub-Committee appointed to test this process of gas purification.

The Committee have also had under their consideration the motion made at last annual meeting, that a report be made on the paper on "Selling Gas." The General Committee appointed a Special Sub-Committee to draw up a report on the above subject, to be presented to you at the annual meeting. The report has been drawn up, and will be submitted to you to-day for your approval.

The Committee have also had under consideration the propriety of appointing a Sub-Committee to make inquiries into the advisability of manufacturing and supplying "Water Gas." The Committee, after deliberating thereon at various Committee meetings, latterly came to the conclusion that the events which had transpired since this subject was first introduced to them, had brought to light facts which warranted them in resolving to allow this matter to drop in the meantime, as they were of opinion that there was no real practical value to be derived by making any investigations into this process of gas-making.

The Committee also accepted the kind offer of Mr. Blair, of Glenfoot, Tillicoultry, to give two prizes—one of £7, and the other of £3, to be given to the authors of the two best-prepared papers: "On the Advisability of Gas-Works Supplying Electric Light," and "On the Utilization of Gas-Works Plant in the Making of Cheap Gas for Supplying Gas-Engines for Driving Electric Lighting Plant, and for Heating, Cooking, and in Direct Supply to Steam-Boilers." Intimation of these prizes, along with conditions, was given to members in circular dated the 5th of May last; but the Committee regret to announce that no papers have been lodged with the Secretary in response to the circular.

The Benevolent Fund has been drawn on to the extend of £15 last year, as against £5 the year previous.

The Statistical Report for 1889, was complied and issued to all the members, as well as to those who gave the necessary information.

The Annual Report of Proceedings, 1889, was published and sent to each member of the Association, according to the rules. It contained the President's address, papers and discussions thereon, a list of the Past-Presidents, new members admitted, names of members of Committee, rules, balance-sheet, &c.

The Committee regret to state that they have been obliged to delete a number of names from the roll of membership owing to death, parties having left the country, parties resigning, and parties in arrear with their subscriptions. Still it is gratifying to find that an equal number of parties are applying for admission as new members; thus showing that the Association is accomplishing the end for which it was originated.

The PRESIDENT said it was a matter of great regret that Mr. Young should have been unable to carry out his experiments. It was impossible for the Association to take up these experiments on the scale indicated by Mr. Young; and consequently they had to give up the question. Water gas had not turned out to be so successful a business as had been supposed by some people; and the Committee did not think it would be of practical value to investigate the process. It was a pity that Mr. Blair's offer of prizes had not succeeded in bringing forward competitors. He hoped the report would meet with the approval of the members.

THE MURDOCH MEMORIAL FUND.

The SECRETARY next read the following report by the Committee on the above-named fund:—

This fund now stands at £309 11s. 8d. It was expected that the pamphlet on Murdoch's life and work, referred to in the last report, would have been issued by this time; but the Sub-Committee learn that the author (a descendant of William Murdoch) has had great difficulty in collecting data for the work. He has resolved to make the book not so exhaustive as at first intended, and will now complete it to suit our purpose. The year 1892 being the centenary of the discovery of coal gas for lighting and other purposes, your Committee will make a strong effort to complete the subscription list; and possibly by that time (if the members so decide) we may have permission to erect in Westminster Abbey a bust of the great inventor and benefactor, and thus give him his proper place among Britain's greatest sons.

The PRESIDENT said it would be necessary to appoint a new Committee for the fund; but he supposed the meeting would re-elect the gentlemen who had acted hitherto. Mr. Terrace was now away from Glasgow; but seeing that he had been so long connected with the movement, he (the President) thought they should continue him, at least for another year;

Mr. A. SMITH (Aberdeen) proposed the re-appointment of the Committee—consisting of Mr. J. M'Gilchrist, of Dumbarton, Mr. J. M'Crae, of Dundee, and Mr. D. Terrace, of Middlesbrough—and the proposition was unanimously agreed to.

THE ROLL OF THE ASSOCIATION.

The SECRETARY then submitted the following list of members who had ceased (by resignation or otherwise) to be connected with the Association: Ordinary members—Messrs. R. T. Ambrose, Bo'ness; T. Fotheringham, Bridge of Allan; G. Harper, Sligo; W. Henderson, Dysart; J. Kellie, Straiton Oil-Works, Loanhead; R. Mackay, Tranent; J. Robb, Haddington; R. G. Shaw, Monte Video; J. C. Sinclair, Rothesay; R. Smith, New Wortley, Leeds; D. Stevenson, Dalmarnock; and J. Swan, Leslie (deceased). Extraordinary members—Messrs. H. Aitken, Falkirk; and A. Donaldson, Edinburgh (deceased). Associates—Messrs. P. Macdougall, Peterhead; A. Robertson, Loanhead; and H. Robertson, Broughty Ferry. Honorary member—Mr. J. Reid, Edinburgh (deceased). The members of the Association number 160 ordinary members, 57 extraordinary members, 15 associate members, and 5 honorary members—total 237. But deducting those resigning, &c., the numbers respectively are 147, 55, 12, and 4—total, 218. Adding to these 7 ordinary, 6 extraordinary, and 3 associate members applying for admission (as per following list), there is a total of 234 members, including 4 honorary members.

ADMISSION OF NEW MEMBERS.

The SECRETARY also submitted applications from the following gentlemen, who were admitted:—

ORDINARY MEMBERS.

Currie, W.	Gas-Works,	Kilmalcolm.
Gillan, A. L.	,,	Portsoy.
Kelly, H	,,	Busby.
M'Kerracher, W. H.	,,	Lesmahagow.
Wilson, A.	,,	Dawsholm.
Young, A. C.	,,	Auchterrarder.
Macdougall, P.	,,	Banff.

EXTRAORDINARY MEMBERS.

Cowan, W. H.	Meter Maker, Edinburgh.
Creeke, R. W. B.	Durie Foundry, Leven.
Hunter, R.	Tar Distiller, Glasgow.
Kerr, A.	Caledonia Foundry, Maryhill, Glasgow.
Robinson, T.	Tar Distiller, Glasgow.
Young, J.	Coal Master, Cross Lynne, Bearsden.

ASSOCIATES.

Easson, D.	Gas-Works,	Perth.
Love, G. R.	,,	Paisley.
Masterton, A.	,,	Edinburgh.

Mr. A. MACPHERSON (Kirkcaldy), in moving the adoption of the reports, remarked that it must be very satisfactory to all that while the Association was yearly losing members, the ranks were always being recruited, which showed that the Association was highly appreciated by the members of the profession.

Mr. A. SMITH (Aberdeen) seconded the motion. With regard to Mr. Blair's prizes, he said it struck him that some of the members had only heard of them now for the first time. He hoped the offer would hold good for another twelve months.

The PRESIDENT said intimation was given in the circulars issued to all the members, inviting papers and lists of suitable subjects as usual. Mr. Smith's suggestion might be a recommendation to the Committee for their consideration.

The SECRETARY said he had no doubt, from the correspondence which had taken place, that Mr. Blair would be willing to renew his offer for another twelve months. Longer intimation would be given this year; and then perhaps a number of papers would be sent in.

Mr. J. M'CRAE (Dundee) thought it was quite safe to rely on the offer being renewed.

The PRESIDENT: We have to lament the loss of a number of our members by death during the past year—Mr. John Reid and Mr. Alexander Donaldson, of Edinburgh, and Mr. Swan, of Leslie. Possibly the one whose loss will be most felt by us is Mr. Reid. He was a very old member of the Association, and an active one, too. His services were of much value; and he will be greatly missed by us. I beg to move that we express our sense of the loss we have sustained through the death of Mr. Reid and the other members. Amongst the list of the members who have resigned there is one very old friend—Mr. J. Robb, of Haddington. He has long been a member of the Association; and he has always taken a great interest in it. I think it would be a fitting recognition of his services, if we added his name to the list of honorary members. I move accordingly.

The reports were then adopted; as was also the President's motion to elect Mr. Robb an honorary member.

AUDITOR'S REPORT.

The SECRETARY said he had received the following letter from Mr. D. Bruce Peebles, of Edinburgh, the Auditor to the Association:

Tay Works, Bonnington, Edinburgh, July 22, 1890.

R. S. Carlow, Esq., Sec., North British Assoc. of Gas Managers.

My dear Sir,—I am exceedingly sorry that it is impossible for me to be present at the meeting of the Association on Thursday first. I have examined the books, and found everything correct. I notice that the credit balance is small; but that can be accounted for by payment having had to be made of the printer's account for two years. Otherwise the balance would have been considerable.

I have now a favour to ask. Will you kindly relieve me from the annual audit of the books of the Association? I have been Auditor for some

fourteen years or thereby; and there are many of the members, I am sure, who will readily undertake the duty, and who have more time at their command than I have. So that I shall be glad if you will be good enough to free me. As I have had nothing but kindness and courtesy shown me in connection with the audit, I shall always look back with pleasure to the official connection I have had with the Association.

I am, yours truly,

D. Bruce Peebles.

The Secretary added that Mr. Peebles had appended the following docket to the accounts: "I have examined the foregoing accounts, and find the same exactly summed and stated, and sufficiently vouched. The balance amounts to the sum of £260, which is deposited in the Clydesdale Bank at the credit of the following funds: Benevolent Fund, £190; Research Fund, £70."

The President: I am sure you will consider this report very satisfactory. We have no great sum lying at our credit in the bank for the general funds of the Association; but it must be taken into account that the charge to members is very small, and it is impossible for us to gather large funds. In fact, we can do no more than just meet our outlays, which are very moderate indeed. Out of the Benevolent Fund, we paid away one small donation last year; and we have £190 at our credit in the bank. We have £70 in the Research Fund. We have not done anything particular in that direction in the past year; but it is open to the members to suggest something with the view of developing scientific improvements in the manufacture and distribution of gas. The retirement of Mr. Peebles I cannot look upon except with regret. Our esteemed friend has served us a long time; and we cannot insist too much on his continuance in office. I should prefer that Mr. Peebles would continue his services. We are deeply indebted to him for the great trouble he has taken in auditing our accounts for many years past. Perhaps we may have to change this office occasionally, as we cannot burden any particular member of the Association with this work.

Mr. J. M'Crae: I am sure I express the sentiments of every one here when I say that Mr. Peebles has conducted his duties in the most satisfactory manner. He is a most worthy member of the Association—esteemed by every one of us; and seeing that he has served us already for fourteen years, and that there is no one better qualified for the office, I think we should unanimously request him to continue to audit our accounts. I beg to move that we return our hearty thanks to Mr. Peebles for his past services, and request him to continue to be Auditor to the Association. (Applause.)

Mr. A. Smith, in seconding the motion, remarked that it would be a great pity if Mr. Peebles were to retire. They were sorry that he was not with them that day; but he (Mr. Smith) hoped they would see him at the next annual meeting, continuing in his capacity as Auditor.

The motion was unanimously adopted.

The President's Address.

The President then delivered his Inaugural Address, which was given in the Journal for the 29th ult. (p. 246).

Mr. A. MacPherson (Kirkcaldy) said he was certain the members had all listened with very great pleasure, as well as profit, to the able address delivered by the President; and there was no one who had ever filled the chair whose words were more deserving of their best consideration. He trusted Mr. Stewart would grant permission to the Secretary to include his address in the report of the annual meeting; for he was persuaded that it would be to the advantage of all to have an opportunity of studying it at their leisure. He moved that a hearty vote of thanks be accorded to Mr. Stewart for his able address.

The motion was carried with applause.

The President expressed his thanks for the way in which Mr. MacPherson's proposal had been received; and said that, as he was unaccustomed to writing addresses, he was pleased to think that his remarks had merited approval. They would now proceed with the reading and discussion of the papers set down on the programme.

Mr. Robertson's Paper.

The first paper was on "Internal Gas-Fittings," by Mr. R. Robertson, of Bathgate. It was given in the Journal for the 29th ult. (p. 249); and it led to the following

Discussion.

The President: You have heard this able paper on a subject which interests the whole of us, and which unfortunately, in our experience, has often proved very annoying, as Mr. Robertson has pointed out. This is a matter on which there should be plenty to say; and I hope we shall have an ample discussion.

Mr. T. Whimster (Perth): No doubt this is a subject of great interest to gas managers; but I may say that I consider it to be rather beyond our province. We have heard before of the rules adopted by the Corporation of Dumbarton to regulate the size of pipes. I should like to know if it is within the power of a corporation to frame such rules. But the size of pipes is not the only thing that interferes with the consumption of gas. Mr. Robertson has referred to composition and tinned pipes as being a source of "jumping" in gas; but I think that gas-fittings such as brackets and lustres are entirely beyond our province, and that we should not touch them. There is another thing which would deter me from expecting a general rule to be passed to this effect, and that is that, if a gas manager secured a monopoly of gas-fittings, it would involve him in tremendous responsibility. Only in large towns could it be undertaken, because in a small place a proper gas-fitter—a man with brains, and having experience in gas-fittings—would require to be paid. His wages must necessarily be good; and unless there were a large concern, he could not get constant employment or anything like it. Employing a tradesman, if you did not have a steady servant, would involve making an invidious selection, which would bring trouble to the gas manager, and would not relieve him of his responsibility. But the first question is: Are there many gas managers present who would undertake to fit up a house (say) with 30 or 40 lights? A gas manager, like an architect, is not master of all trades; though he may, from necessity, try his hand at the whole of them. But I believe there are few gas managers who have a practical knowledge of gas-fitting; and therefore you cannot expect a good job from them. The next thing is that, if you go in for proper material and efficient workmanship, your bill will be far higher than that of a tradesman. Unless you had a monopoly, you would be brought into competition, and whipped out of the market. For these reasons, I cannot see my way to approving of gas managers undertaking the gas-fittings of a city.

The President: I do not think Mr. Robertson proposed that gas managers should undertake the gas-fitting in a house. It was only suggested that he should advise as to the size of pipes. Mr. Robertson commented on the quality of gas-fittings, such as brackets, and so on.

Mr. J. Hall (St. Andrews): No doubt this is a very important subject; but I think Mr. Robertson has placed on the back of gas managers a burden they should not bear. The fitting-up of a house, especially a large one, with gas is a very difficult matter; but, like all other things, it can be done if you pay for it. There has been a great improvement in this department within the past few years. There are gas-fittings *and* gas-fittings; and there are gas-fitters *and* gas-fitters. There are brackets and burners without number, and chandeliers too. If you have the money, you will get the right thing—there is no doubt about that. I think there are some gentlemen here who are makers of gas-fittings; and they should be able to say something on the subject. It is not fair to condemn the gas-fittings altogether, when we have such a large choice in every department. It is also unfair to lay too much blame on the backs of architects. In Mr. Robertson's paper, I think some of the expressions were rather strong. Architects now-a-days do plan and consider well the fitting-up of a house. The province of a gas manager, so far as the fittings of a house are concerned, is purely to give advice when asked. If he attempts to control the size of pipes and the kind of burners and brackets to be used, he is immediately set down as an interested party. I do not think it is altogether fair to contrast the supply of gas by companies with the supply of water by corporations, because they are very different. You see that there would be a great waste of water if it were not inspected to its termination, because it is not measured by meter; whereas gas is measured when it enters a house. The gas companies, therefore, are protected; but not the water commissioners. All that gas managers have been able to do in respect of fittings has been in the shape of giving counsel; and I find that those who wish to have good lights, and are prepared to pay the necessary money, are always ready to receive advice. It is the small consumers who give most trouble. The estimates for small houses are generally cut low; and hence inferior workmanship is put in. Gas-fitters think it sufficient if they can carry the gas; but the householder is not long in finding out his mistake. The complaints which arise regarding gas-fittings do not so often come from good houses as from those of an inferior class.

Mr. A. Smith (Aberdeen): In my experience, I have never had any difficulty with a respectable architect. He is always ready to put up fittings of sufficient size and of good quality. I have found the greatest difficulty with small men, such as builders, who are architects and everything else in connection with a house. It is these who do the "shoddy" or "jerry" work, as we may term it, and use the bad quality of pipes to which Mr. Robertson has referred. He told us that composition pipes, when they are tinned, are fairly good; but that untinned pipes lead to the gathering of water and caused jumping. Would these pipes cause jumping if there were a dry meter? Is it something in the nature of the pipes that draws the water, or is it that the pipe is too soft and sags? I think with Mr. Whimster and Mr. Hall, that we should not carry more on our shoulders than we have to bear at present. If we undertake the arrangement of the internal fittings, we shall be charged with having an interest in the matter; and there is no fear of these fittings being carried out improperly if we have good men to deal with.

Mr. J. M'Donald (Denny): With regard to Mr. Robertson's remarks respecting the quality of pipes, such as block tin and composition, I have to ask whether any jumping will occur if the pipes are properly laid. If they are, there is no more cause for water gathering in composition than in tin pipes. You can get a composition pipe of any weight. It often happens that the common composition pipe is laid over the joists, and forms ups and downs, so to speak. The gas passing through is condensed, and then you find the obnoxious jumping. But if the pipe is properly laid, matters are quite different. The inspector is often a joiner or a mason, who knows nothing about gas-fittings, and does not understand how a pipe should be laid.

Consequently, the pipe is put down in any way, without inspection; and then complaints are made about the gas. All inspectors of buildings should be able to tell a gas-fitter how the pipes should be laid. I am glad Mr. Robertson has referred to architects, for they are often very much to blame. I know an instance of specifications being submitted for two churches, each with 60 lights. In the one case the architect used ½-inch, and in the other 1½-inch pipe—a very great difference in the two sizes for the same number of lights. This fact shows that architects often know very little about the size of pipes to put in; while if we advise them, they tell us they know more about the subject than we do. Then we sometimes see a gaselier for four or five lights, which, after the fitters have taken a ½-inch pipe to it, is found to have such a small drop-screw that, if one of the lights is turned off, the flames of the others are immediately sent up. You have a ½-inch pipe; but it is choked inside by a $\frac{3}{16}$-inch pipe; and the smallest piece of grease getting inside chokes it altogether, so that there is only sufficient gas for one light instead of five. It might be well if the Committee were to show some of the best kinds of globes for the benefit of managers from the country, who do not have the same opportunity as their brethren in the towns of inspecting the most improved classes of globes.

Mr. J. TURNBULL (Lauder): I have very often found people putting in insufficient meters. In one case I have seen a 2-light meter supplying 20 lights; while in another instance—that of a 10-light meter—a ⅜-inch pipe was led way from it. It will thus be seen that there is a difficulty even in giving advice.

Mr. W. CHEYNE (Briton Ferry): I have listened with great interest to Mr. Robertson's paper; and I can say, with Mr. Hall, that there are fitters *and* fitters. We try to meet the small householders by fitting up their places for them, and giving them three years in which to pay the money. We look to getting our profit from the sale of gas. We put in the fittings at the lowest price, and uphold them for three years, so as to get a good job. I disagree with our friend in regard to the galvanized iron pipes. We find that these pipes become corroded inside—not with rust, but with a sort of fur that comes away from the zinc. If they could be galvanized outside, and the inside left black, it would be an improvement—the same as mains if they were coated outside and left uncoated inside. I have found a ½-inch pipe pieced up with a ¾-inch pipe. You could not complain of the workmanship; but because the men did not happen to have a pipe of the same size, they simply took that which came handiest. I have also seen at a cross branch a ⅜-inch pipe soldered on to a ½-inch pipe; the hole allowing the flow of gas having been made by a small bradawl. So far as the quality of pipe goes, I may say that we never use block tin; and I do not think we are troubled much with jumping lights. If you use wet meters, you must put supports under the pipes, and give them a good fall. Our consumers prefer to have dry meters. I think the great cause of a bad supply is not the pipes, but employing unions. We never use a union joint in the South. We solder pipe to pipe—opening the pipe large enough to receive the branch, and then blowing the joint. Another thing in connection with internal fittings is that sometimes you will have (say) a ¾-inch pipe, and you have to branch off two ways. Well, you will reduce the pipe there; but instead of reducing it with a Y-piece, you put on a square joint—a ¾-inch on to a ½-inch pipe, which at once interferes with the flow of gas. The "burner man" is the plague of the gas manager. His principal object, in fact, is to run down the quality of gas, and tell the consumers how foul it is, and that if they take his burner the foul gas will be sent back through the meter, and the good gas through the burner. (Laughter.) I have received a circular from Mr. Gardner, of Glasgow, in regard to globes. I use a globe with a wide opening at the bottom, and six small holes round the top; and this, of course, keeps the flame in heated air. There is no smoke, the globes are not liable to break, and you get a far better light. At Briton Ferry we do all things with the blowpipe. We use certain tools for opening up and fitting the pipes; and these I shall be glad to show you.

Mr. T. D. HALL (Montrose): I have heard before of bad gas-fittings; but I think there is one point that has been just touched on, but has not received sufficient notice, and that is the meter. Ninety per cent. of our complaints are traced to the meter; and the message comes to us again and again: "There is something wrong with the meter." When we consider the very small orifices through which the gas finds its way before it comes to the point of combustion, it seems wonderful that it should reach it at all. If we could get a proper meter for measuring gas without the use of water, we should gain a great point. We, as gas managers, know where the water in the fittings comes from; but the consumers do not. They think it comes from the gas; but we know that this is thoroughly condensed before it leaves our works, and tha the whole of the water we find deposited in the fittings is from the meter. Then the question arises: Why use an instrument that gives so much trouble, when we might have one that will measure the gas equally well without that trouble? We have found that, by introducing dry meters, the fittings require almost no attention; and this is a point we should look to more than the gas-fittings. With regard to unions, I think it is a mistake to have any brass between the joints of a pipe. We find that choking generally takes place at this point; and by cutting out the unions and putting in a dry meter, the supply becomes almost perfect.

Mr. HALL (St. Andrews): I differ from the conclusions of the last speaker. I would never join one gas-pipe to another without a union. I do not believe that all the water found in gas-pipes comes from the meter. My experience is very different. In fitting up a house you might have occasion to pass a gas-pipe across the breast of the chimney or vent, in which there is considerable heat. Your gas is heated in passing this point, and then it goes to another part of the house where it is exposed to a draught. There it is condensed, and the water comes from the gas itself, and not from the meter.

Mr. J. M'CRAE (Dundee): It has been asked by Pope, in one of his moral essays: "Who shall decide when doctors disagree?" I should be sorry if it went forth from this meeting that we condemn the wet meter, and uphold the dry one. If a house is properly fitted up, any kind of meter will do; and I do not think we should adopt the dry meter simply to relieve the effects of defective fitting. My advice would be to fit up a house properly, and to adopt the wet meter.

Mr. T. D. HALL: I admit that unions are necessary where you have to uncouple the pipes to blow the water out. Where you are dealing with an old house, I would put in a dry meter; but in fitting up a new house, if you do it properly, it does not matter what kind of meter you use.

Mr. ROBERTSON: I am very much obliged to you for the manner in which you have received my paper; and I am pleased that it has brought out so good a discussion, which I have no doubt will prove very profitable. The questions put by Mr. Whimster, Mr. Hall, and Mr. Smith run pretty much on the same lines. My chief contention was that a gas manager should become acquainted with the internal fittings of houses, so that he might be able to throw out hints as to the proper sizes of pipes and the best material to be used. This is a subject which might be more closely followed up by gas managers with a great amount of good. Mr. Hall made reference to water-fittings and gas-fittings; but the one case does not bear on the other, because we have a check put upon gas consumers by meter. What I tried to bring out in the paper was the saving of these everlasting complaints we are always hearing about leaky joints and bad gas. If we had some test by corporations, it would do a great deal of good in this way. Mr. Smith alluded to common composition pipes; and I was asked if the tinned and untinned pipes were both of the same quality. My reply is that they were, only the one has received a coating of tin inside and out, which protects it from moisture, and also stiffens it. There is a great difference in the hardness of common composition and tinned pipes. There is something in the nature of the composition pipe that draws the moisture more than the tinned kind. We have found this over and over again. There was one house which had been fitted up a good many years; and we were cutting away a certain part where the pipe was carried through a 4-inch partition. There was a jumping of the lights; and we thought it arose from some defect in the pipe. So we cut it out, and put in a tinned pipe on the same level as the one we removed; and the jumping ceased.

Mr. HALL (St. Andrews): Was the pipe of the same size as the one you took out?

Mr. ROBERTSON: Yes. Then there is the question of a 5-light gaselier, having a small drop-screw occupying something like ¼ inch or $\frac{3}{16}$ inch—a size quite insufficient for the supply of such a quantity of lights. I always look to see that the meter is of adequate size for the number of lights. I think we should have a meter with a capacity beyond the amount of gas used. A question has also been raised as to gas companies undertaking the fitting-up of houses. I do not think this matter can be discussed just now, but it might form the subject of another paper. As to the shape of couplings, I would say: "Never fit up a house without putting in couplings; because if there are any repairs to be made, you can unlose the coupling and detach the whole arrangement." I would also say: "Put in unions wherever you can; but be sure you put them in of the proper size." I am inclined to think that the water in pipes does not come from the meter; and in the case to which I refer, it could not have done so.

Mr. HALL: Where did it come from?

Mr. J. M'CRAE: It "growed." (Laughter.)

Mr. HALL asked Mr. Robertson if he ever found water in fittings with a dry meter.

Mr. ROBERTSON: Certainly, I have. I think I have now answered all the questions; and I am pleased you have listened so attentively to my paper.

The PRESIDENT: I am glad to find that Mr. Robertson's paper has brought out so interesting a discussion. We are very much indebted to him; and I move that we accord him a hearty vote of thanks.

The motion was carried with applause.

[The report of the rest of the proceedings will be given in next week's JOURNAL.]

Mr. Skea, Gas Manager at Alyth, has been appointed, out of 47 applicants, Manager of the Kinross and Milnathort Gas Company. The former Manager of this Company (Mr. A. Lobban), it may be remembered, recently sustained a fatal accident on the railway.

NORTH OF IRELAND ASSOCIATION OF GAS MANAGERS.

In the JOURNAL last week, we reported the general proceedings at the third annual meeting of the above Association, held at Newry on the 12th inst., under the presidency of Mr. Andrew Gibb, whose Inaugural Address was included in our report. We must hold over till next week Mr. Featherstone's "Notes on Retort-Furnaces;" but give to-day the paper (with the discussion thereon) read by Mr. M. Martin, of Drogheda, on

RETORT-SETTINGS.

I had no intention of so soon taking a prominent part in the work of the Association; but having been specially requested by our respected President to contribute something on this occasion, and believing as I do that it is the duty of each member to try in whatever way he can to promote the interests of the Society, and to give to his fellow-members the benefit of any experience he has gained in the pursuit of the profession in which we are all concerned, I have selected the above subject, and have prepared a model of a system of retort-setting which I have devised. I have now used this setting for fourteen years; and it has given, and continues to give, me every satisfaction. This paper will be short and unpretentious; being mainly a description of the setting, a model of which is before you, and which I shall endeavour to make as clear to you as possible as I proceed.

The model represents a setting of five fire-clay retorts, and is constructed to the scale of an inch to the foot. The oven is 8 feet wide and 7 feet high from the bed of the bottom flues to the centre of the arch. The retorts are D-shaped, 24 in. by 14 in. inside, and 9 ft. 6 in. long. They are of the ordinary make —3 inches thick, except at the mouth, where they are 4 inches thick, to take the flange of the mouthpiece. The furnace, which is 14 in. to 24 in. wide and 2 ft. 10 in. deep, contains two heavy strong bars of wrought iron, 2⅜ inches square and 42 inches long; each weighing 84 lbs. These keep in good condition for twelve months. The level of the flame bed is 12 inches over that of the bars; and on it is a check wall 15 inches high, and 12 inches behind the bars, to prevent the coke from going too far back on the flame bed.

I shall now describe the course which the flame is obliged to take in travelling through the setting. Over the furnace and flame bed, and from front to back of the oven, are six arches, each 9 in. by 4½ in., with a space between every two arches of about 7 in. These spaces admit of a free passage for the flame; bringing it into contact with the sides and bottom of the top retort, and also the sides and part of the bottoms of the two middle retorts. It is then drawn to the back end of these two retorts, and down to the flue under each of them; and then on to the front of the oven, where it emerges over the flues, along the outside of the bottom retorts, and fills the whole space over the middle and top retorts. It is then drawn down on each side, entering the flues already mentioned, and running along the outside of the bottom retorts to the front of the oven, where it drops down into No. 1 flue under the bottom retorts, passing through it to the back, and then turning through No. 2 flue comes to the front again. Here it descends again into three bottom flues under all—No. 1 conveying it to the back, No. 2 to the front, and No. 3 to the back again, where it enters the upright flues built in the back wall of the oven, ascends into the main flue on the top of the bench, and thus to the chimney. You will observe that the flame, from the time it is generated until it gets clear of the oven, is obliged to travel about 100 feet on each side, and the direct heat from the furnace heats the parts of all the retorts next to it.

These retorts are each charged every six hours with 2½ to 3 cwt. of coal. The coal used is all Pelaw Main, except in winter, when we mix with it about one-fifth part of cannel. Our average production of gas is 10,000 cubic feet per ton of coal carbonized. The coke is of good quality; and we use about one-third of it in the furnaces. All the retorts are well and equally heated.

The opening in the furnace door-frame is 24 in. by 14 in. The door is in two parts—the top part being 15 inches, and the bottom 10 inches. This oblong opening allows the clinkering bar a long range of leverage. To assist in taking off the clinker, we use a fulcrum block, with a long handle, which is slipped in under the bar, and increases the power very much. All the charging during the principal part of the year is done with scoops. We have four men on each shift of twelve hours, and our maximum make is about 120,000 cubic feet per 24 hours.

You all know that it is in the retort-house that the principal part of the profits of a gas concern are made; and therefore it is all-important that every attention should be given to that part of the work, and that the retorts should be kept in good heat, and no gas allowed to escape through them. If we have poor heats, and leaky retorts, we cannot expect to have good financial results. I have no doubt that you are all doing your best in this direction, and that you have settings equally as good as mine—perhaps some of you have better; but I have introduced to you this system (which is solely my own idea), because I have realized such good results from it, and have so much pleasure in working it.

Discussion.

The PRESIDENT said that Mr. Martin's paper was a valuable one; and he hoped the members would have an interesting and instructive discussion upon it.

Mr. E. STEARS (Lisburn) inquired how much of the coke produced was used in heating the retorts.

Mr. MARTIN: One-third.

Mr. R. Ross said he wished to know what was the amount of gas produced per mouthpiece.

Mr. MARTIN said his production was about 5000 cubic feet per mouthpiece.

Mr. FEATHERSTONE said that what struck him about the setting was the size of the bed. There was no doubt that there was plenty of room there; and he should like to try it, but did not see how he could manage it.

Mr. Ross: What is the width of the wall?

Mr. MARTIN: It is a 9-inch wall.

Mr. Ross said he could not understand how a wall of 9 inches could stand the heat of the furnace.

Mr. FEATHERSTONE pointed out that there was a space an inch wide, to allow the flame to spread.

Mr. Ross said that all the same, it was a mystery to him how a 9-inch wall stood such a high heat without cracking.

Mr. MARTIN said his experience was that the wall stood very well for a season—that was about six months.

Mr. FEATHERSTONE asked what was the length of the retorts.

Mr. MARTIN: 9 ft. 6 in.

Mr. FEATHERSTONE considered that a charge of 2¼ cwt. was very small.

Mr. MERRILEES inquired what was the depth of the fire.

Mr. MARTIN: About 2 ft. 10 in. from the bars to the centre of the arch.

The PRESIDENT here said he desired to make a proposal to the members, which he thought would be of advantage. This desultory conversation would not look well in the report; and he therefore suggested that each member who desired to speak should put his ideas before the meeting in a proper form, and then Mr. Martin could reply and wind up the discussion. He thought this would be a better course of procedure than that which they had hitherto adopted.

Mr. WHIMSTER said he thought the paper was an admirable one; and the members should feel deeply indebted to Mr. Martin, who had been especially kind in going to the trouble of making the excellent little model before them to assist them in following the paper. Any description of retort-setting was rather bewildering, particularly to outsiders; but Mr. Martin had been more than ordinarily explicit, and the model had been most valuable in enabling them to perfectly understand what he wished to convey. Mr. Martin had described the results he had achieved as being very satisfactory; and there was no doubt but that he must have had good heats. He was afraid that he (Mr. Whimster) could not find room in his settings for the side flues which were shown in the model, and which appeared to have been of such great advantage to Mr. Martin. What he admired most about the arrangement was the good use Mr. Martin made of the heat; and he was sure that, when it reached the chimney, the air could not be of a very high temperature. He thought that, with all the bye-passages shown, it could be made use of as a regenerative furnace, and for the purpose of heating an additional supply of air. He fancied that, if this was done, the result would be a very much greater economy in the consumption of fuel. He did not know what was the experience of others on the subject; but, in his opinion, if there was a secondary supply of heated air, there would be a saving of fuel.

Mr. FEATHERSTONE agreed with the Secretary as to the regenerative furnace; and he thought that perhaps a deeper fire might be a further improvement upon the arrangement.

Mr. MERRILEES said he had been struck with the same point as Mr. Ross; and he could not understand how a 9-inch wall could stand the heat of the furnace for a season. His opinion was that such a wall would crack and collapse very soon, when subjected to such a severe heat; and, in his judgment, the wall should be very much thicker than it was.

On the invitation of the President,

Mr. J. B. TERRACE (Brechin) said it had been a great pleasure to him to attend that meeting; and he felt highly honoured in being asked to take part in the discussion. With regard to the 9-inch wall which had been referred to——

Mr. MARTIN: Perhaps I should mention that it is composed of 9-inch blocks.

Mr. TERRACE said that it was only 9 inches after all; and Mr. Ross was still in his dilemma, as to the capability of such a wall to stand the heat. He must say that it was a new thing to him to see the flues carried backwards and forwards in the manner shown in the model. He himself carried them under the bottom retorts and then upwards. Whether the arrangement made by Mr. Martin was a better one, he could not say. He was only telling them what was his own practice and experience. He was surprised, however, to hear that Mr. Martin's arrangement only lasted for one season. He always tried to make his last for three seasons—about eighteen months, or as long as it would stand cleaning. He found that the flues very often became closed up, and had to be cleaned out, which gave great trouble. Indeed, on one occasion he had to make a hole at the back because the flues had become choked up there. With regard to the make of gas, he thought they should be able to charge oftener than once in six hours.

Mr. WHIMSTER said that Mr. Terrace was speaking of

cannel coal; but he should remember that they had none of it in Ireland.

Mr. Ross said that was so; and it was impossible to compare the one with the other.

Mr. TERRACE (continuing) said he thought that a make of 5000 or 6000 cubic feet of gas per mouthpiece was very small.

Mr. WHIMSTER said that Mr. Terrace's experience might be different to theirs; but 5000 or 6000 cubic feet was undoubtedly a good make in Ireland.

Mr. TERRACE was very glad to hear it. He thought Mr. Martin deserved their best thanks for his valuable paper.

Mr. MARTIN said it might be well for him to explain that it was the furnace which was renewed every season. The retorts lasted generally for three seasons. There was not much choking up of the flues; but they had openings for cleaning purposes if necessary. They had also something similar in the back wall of the retort-house.

Mr. Ross observed that they could not compare the results of cannel coal and the results of the coal used in Ireland; and it was impossible to charge oftener than every six hours. Of course, if they were dealing with cannel coal, it would be a different matter altogether.

The PRESIDENT said he was sure he was only expressing the feeling of every member present when he said that he had enjoyed Mr. Martin's paper very much; and he was glad to convey to Mr. Martin their hearty thanks.

Mr. MARTIN briefly acknowledged the compliment.

THE RELATION OF THE YIELD OF COKE TO THE COMPOSITION OF COAL.

An article on the above subject which appeared in the number of the *American Gaslight Journal* for the 4th inst. contains some interesting remarks by Dr. Muck which we reproduce below.

The author asserts that the relation between the quantity of residue after calcination in an air-tight chamber—in other words, the coke—and the proportional composition of the ocal is simpler than the relation between the latter and the fusibility of the coal. Less complex also are the relations between the fusibility of the coal and the extent of yield in coke. This is by no means proportional to the quantity of any single organic constituent (carbon, hydrogen, oxygen, and nitrogen) or to the sum of any two of them, some isolated cases excepted. It is, however, established by numerous experiments that it is affected far less by the amount of carbon contained than by the amount of hydrogen and oxygen (*plus* nitrogen), but especially by the amount of so-called disposable hydrogen.

A striking example of this is offered by two kinds of coal occurring together in one of the veins of the Hanover Mine. These are glance coal or anthracite, and that variety of dull, slightly bituminous coal which occurs in conjunction with anthracite. The following is the percentage composition of the coal: Carbon, 84·74; hydrogen, 5·26; oxygen, 10·00. The anthracite contains: Carbon, 82·99; hydrogen, 5·30; oxygen, 11·71. The coal yields 63·80 per cent. in coke; and the anthracite, 68·05 per cent. The bituminous coal with the greater content of carbon and the smaller content of hydrogen and oxygen, is thus seen to give a smaller percentage of coke than the anthracite, which contains less carbon but more oxygen. To 1000 parts of carbon, however, the bituminous coal contains 47·33 parts of disposable and 14·75 parts of combined hydrogen; while the anthracite contains 46·23 parts disposable, and 17·64 of combined hydrogen. The small difference of 1·10 parts of disposable and 2·89 of combined hydrogen per 1000 of carbon thus brings about the very significant difference, amounting almost to 5 per cent., in the yield of coke. A somewhat similar difference in the yield of coke is shown by two coals from the Hannibal Mine in Westphalia, which differ little in content of carbon, but one of which contains 3·27 parts of disposable hydrogen per 1000 of carbon more, and only 0·9 part of combined hydrogen less than the other.

The preponderating influence of the disposable hydrogen on the extent of the yield of coke is more or less apparent on all sides; nevertheless the yield of coke does not by any means always stand in the same relation to the amount of hydrogen per 1000 parts of carbon. When coals very rich in oxygen yield a very low percentage of carbon, this must be attributed to the fact that coals rich in oxygen are usually also very rich in hydrogen. That the amount of residue from dry distillation depends principally on the content of hydrogen, and especially on that of the disposable hydrogen, is to be explained briefly as follows: With the exception of a small remainder in the coke residue, the oxygen and hydrogen of the coal entirely disappear. In the manufacture of illuminating gas, the oxygen of the coal is found for the most part in the condenser, as ammonia water; in the raw gas it is found as carbonic acid and carbonic oxide, and finally in smaller quantity in the oxygenous constituents of the tars. The amount of hydrogen which is not "burned" to water by the oxygen contained in the coal, disappears for the most part in condensable or non-condensable hydrocarbons, and is only present in smaller quantities in the hydrogenous acids of the tars.

The free hydrogen contained in illuminating gas results from the decomposition of hydrocarbons at high temperature. Carbonic acid and water are only in very small quantity transformed, with the carbon of the glowing coke in the retort, into hydrocarbons and carbonic oxide; for the latter is not present in illuminating gas in large quantity. Since, however, it is demonstrable that the oxygen disappears only in part in the form of water, and only in the smallest quantity is combined with carbon and hydrogen (the remainder being combined with carbon in carbonic acid and carbonic oxide), there must remain a considerable quantity of hydrogen free to form hydrocarbons. Apart from the consideration that by the side of the carbonic acid, carbonic oxide is also formed secondarily, it is clear that the disposable hydrogen is in a position to carry away a much larger quantity of carbon than the oxygen, even if the latter took up only carbon; for one atom (12 parts by weight) of carbon is changed to carbonic oxide by two atoms (32 parts by weight) of oxygen, while one atom of carbon is changed into light carburetted hydrogen (CH_4) by four atoms (4 parts by weight) of hydrogen. Consequently, the disposable hydrogen is able to carry away an eight times larger quantity of carbon than the oxygen, and this even under the unfavourable conditions that only a hydrocarbon very poor in carbon is formed. As a matter of fact, in the process of dry distillation, along with light carburetted hydrogen are formed many other volatile products far richer in carbon.

RESEARCHES ON THE VOLATILE CONSTITUENTS OF COAL TAR.

In a recent number of *Dingler's Polytechniches Journal*, Herr J. Biehringer gave an account of some researches he had been conducting on the most volatile constituents of coal tar. An abstract of his communication appeared in the last number of the *Journal of the Society of Chemical Industry*, from which we extract the following particulars.

In their investigations of the most volatile portions of coal tar, authors have hitherto employed the first runnings obtained by the distillation of benzene hydrocarbons which have been subjected to a preliminary treatment with acids and alkalies. On this account a number of substances present in the crude material have escaped identification, owing to their removal by this treatment, whilst new bodies formed by the action of acids and alkalies have been isolated which could not be detected in the raw material; and it is doubtlessly due to this circumstance that conflicting statements have from time to time been published regarding the presence or absence of a number of substances in the most volatile portions of coal tar. The author therefore thought it desirable to employ unrefined benzene hydrocarbons for the purpose of his investigation; special attention being also given to the quantitative determination of the more important constituents by simple and accurate methods. At first, the portion of English 90 per cent. benzene boiling between 30° and 80° was used, of which about 1·5 per cent. was obtained. Subsequently, the fractions boiling at from 50° to 60° and 60° to 70° were chosen; the fractions being marked L 1 and L 2 respectively. They form colourless, mobile, strongly-refractive liquids (assuming a yellow colour on standing), and possess a disagreeable penetrating odour, which causes headache and slight giddiness after prolonged inhalation. The taste is caustic. Blue litmus paper is turned red. They burn with a luminous smoky flame, which gives off an unpleasant odour. All attempts to isolate the different constituents by fractional distillation were unsuccessful. Thus the fraction L 1, which gave about 66 per cent. between 50° and 60°, began to boil at 40°, and left a considerable residue boiling above 60°; and although, after several fractionations, it was possible to gradually concentrate the carbon disulphide in the portion boiling below 50°, the results were by no means satisfactory, as this end could only be achieved at the expense of the higher boiling portion. It would, in fact, seem as if it were not merely some peculiar property brought about by the process of fractional distillation which gives rise to this anomaly, but as if during the distillation the mixture suffered decomposition; forming new substances which considerably influence the boiling point. The author therefore tried the following methods: He attempted to remove by some means the bodies known to be present, and then searched for new substances; and in a second series of experiments, he made a number of tests to detect the presence or absence of certain hydrocarbon series by means of well-known group reagents.

Dealing first with carbon disulphide, the author pointed out that it was first obtained by Vincent and Delachanal from the low boiling portions of unrefined benzene. Its presence completely masks the results obtained by fractional distillation; and as acids and alkalics fail to remove it, commercial benzenes are almost invariably contaminated therewith. For the quantitative determination, Hofmann's process was tried. This is based on the formation of a well crystallized red additive compound when carbon disulphide is brought into contact with the triethyl-phosphine. The author used pure carbon disulphide boiling at 46·8°; but failed to obtain satisfactory results, though he is unable to explain the cause of this. The numbers were invariably too low. He then tried the xanthic acid reaction. For this purpose a measured quantity of carbon disulphide, or liquid containing the latter, is added gradually to an alcoholic solution of potash, when potassium xanthate is formed. The

amount of the latter is then estimated as cupric xanthate by adding a decinormal solution of cupric sulphate until there is a slight excess of the copper salt, which is ascertained by placing a drop of the solution from time to time on a double filter-paper, and testing the liquid on the lower part with potassium ferrocyanide. One cubic centimetre of the copper solution is equal to 0·0152 gramme of carbon disulphide. The method gives good results. The following numbers were obtained: Fraction boiling between 30° and 80°, 57·30 per cent.; fraction L 1, 19·80 per cent.; fraction L 2, 19·17 per cent. The amount of potassium xanthate may also be estimated by means of a standard iodine solution. The author, however, found that with pure carbon disulphide the results were about 2·5 per cent. too low. In order to remove the carbon disulphide, the following method was adopted: From 1000 to 1200 grammes of first runnings are placed in a flask and treated with from five to six times their weight of alcohol; the flask and contents being kept in a cooling mixture to prevent loss by evaporation. A constant stream of dry ammonia is then introduced through a wide glass tube until the separation of solid xanthate is complete, when the mixture is filtered rapidly through a cotton filter, the filtrate being collected in a separating funnel. The lower layer contains the alcohol, some water, and a small amount of hydrocarbons in solution. In order to separate the latter, the mixture is diluted with water, and the product thus obtained added to the upper layer, and the whole subjected to another treatment with alcohol and ammonia. It is advisable to repeat this operation a third time, in order to ensure the complete removal of all sulphur compounds. The hydrocarbon liquid is then washed thoroughly with water, and dehydrated with calcium chloride. The removal of carbon disulphide reduces the specific gravity considerably; thus in the case of fraction L 1, it fell from 0·8148 to 0·7401.

The author was unable to isolate ethyl alcohol from any of the fractions obtained by the distillation of light benzene. He, however, obtained a faint reaction for ethyl alcohol from a sample which had been in contact with water for a fortnight; and he concluded from this result that light benzene contains an ethyl compound which is gradually decomposed by water with formation of ethyl alcohol. The examination for phenols was conducted in the following manner: After treatment with hydrochloric acid, the light benzene was shaken up with dilute soda lye. The akaline extract was then acidified with sulphuric acid, and distilled with steam or extracted with ether. In both cases a product having a tarry odour was obtained; but the quantity was too small to admit of further investigation. To detect the presence of mercaptans in light benzene, the different fractions were heated with mercuric oxide and alcohol; and in a second series of trials, they were added to an alcoholic solution of mercuric chloride. The presence of mercaptans could not, however, be established with certainty, as only a slight turbidity was obtained.

With regard to the detection of bodies belonging to the pyrrol, thiophen, and furfuran series, also of hydrocarbon and of benzene series, the author found that the vapour from fraction L 1 imparts a greenish colour to pine shavings moistened with hydrochloric acid. The reaction with phenanthraquinone and with isatin and concentrated sulphuric acid gave no coloration. It was not possible to separate aromatic hydrocarbons by treatment with a concentrated solution of picric acid, although benzene was found in the residue obtained by fractional distillation. The different fractions from the distillation of light benzene absorb bromine very eagerly, and form additive as well as substitution compounds. The group of unsaturated compounds includes derivatives of acetylene; the author having found that, on adding an ammoniacal solution of cuprous chloride to light benzene, and allowing the mixture to stand, a red-brown precipitate was obtained.

Manchester District Institution of Gas Engineers.—The eighty-third quarterly meeting of this Institution will be held next Saturday at Lancaster, under the presidency of Mr. Walter W. Hutchinson, of Barnsley. According to the programme of arrangements issued by the Honorary Secretary (Mr. S. S. Mellor, of Northwich), the members and friends will arrive in Lancaster about noon. After partaking of luncheon at the King's Arms Hotel, a visit will, by permission of the Gas Committee, be paid to the gas-works, where the process of the distillation of tar as carried on there will be briefly explained by the Corporation Gas Engineer (Mr. Charles Armitage). The members will then proceed to the Castle, which will be inspected; and subsequently re-assemble at the King's Arms Hotel for the transaction of the business. The names of three new members will be submitted—Mr. W. Whatmough, of Heywood; Mr. J. Swan, of Ulverston; and Mr. Timothy Duxbury, of Middleton. Mr. T. Newbigging's paper on the "Utility of Water in Gas Manufacture," presented at the meeting of the Institution in November last year, will be discussed; and a paper on "A Combined Washer, Tar Extractor, and Exhaust Regulator," will be read by Mr. G. E. Saville, of Todmorden. At the close of the business the members will drive to Morecambe, where they will take tea; and thence will return direct to Manchester. The programme offers a judicious combination of business and pleasure; and the meeting should be profitable all round.

REGISTER OF PATENTS.

Water-Supply Systems and Automatic Valves employed Therein.—Simin, N., of Moscow. No. 12,370; Aug. 3, 1889. [8d.]

The patentee claims as his invention a water-supply system for protection from fire, ensuring a delivery of water (at the hydrants, standpipes, or other connections provided for use in case of fire) at a pressure in excess of the normal pressure, and in quantity equal to the total capacity of the conduit normally employed for ordinary consumption.

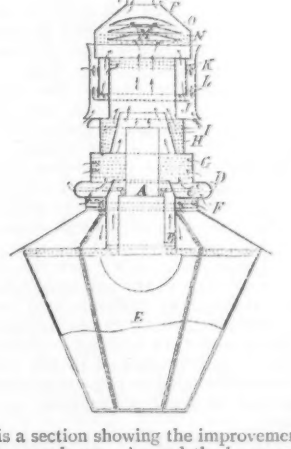
In the course of his specification, the patentee remarks: In order that a water-supply system may be employed to the best advantage in case of fire, it must comply with the following conditions: (1) An adequate and regular supply must be available at the hydrants; and (2) the water must be delivered under sufficient pressure to enable it to be thrown on to the flames without the aid of pumps or fire-engines. With water-supply systems as heretofore arranged, the supply is too frequently found to be wholly inadequate to enable the fireman to cope with any considerable conflagration, partly because the water supply is (at least in the daytime) being drawn upon at the same time for the ordinary requirements of the town. By means of this invention, an ample supply of water under a suitable pressure to enable it to be utilized directly without the aid of pumps or fire-engines can be obtained without having recourse to the expense involved by laying down mains of a capacity far in excess of the ordinary requirements of the town. With this object, on an outbreak of fire, the supply of water for domestic and other ordinary consumption is automatically cut off by the action of the increased pressure in the pipes and the whole of the supply is thus rendered available for extinguishing the conflagration, by means of valves specially constructed so as to close automatically when the pressure is raised to the extent required in case of fire. A suitable construction of valve for this purpose is obtained by employing a piston or elastic diaphragm arranged to be acted on by the pressure of the water on one side only, and connecting this piston to the valve which is also loaded by a weight and lever, or the like, so adjusted as to be capable of maintaining the valve in the open position under the normal pressure, but which yields, and causes the valve to close, when the pressure is increased as described. In order to prevent the valves opening when the pressure falls to its normal degree, they are provided with catches, which engage with the weighted levers or other moving parts, and prevent the valves from opening until these parts have been released; or the piston or its equivalent may be dispensed with and the weight or spring adjusted to enable the valve to close automatically in the manner required, and remain closed until opened by hand.

Gas-Engines.—M'Allen, C. F. A., of Handsworth, near Birmingham. No. 13,572; Aug. 28, 1889. [8d.]

The claim for this invention of "improvements in gas or oil motor engines" is for an engine having a working cylinder and a pump in connection therewith for exhausting the products of combustion, moving the pump plunger relatively to the working cylinder piston, and arranging the passage from the working cylinder to the pump in such a manner that the pump plunger during the first half (more or less) of the in-stroke of the piston exhausts from the working cylinder the products of combustion which remain after the relief of pressure, and simultaneously draws the uncompressed charge into the working cylinder. Thus at every revolution of the crank-shaft, there is in the working cylinder, and at the same side of the piston, ignition and combustion of the charge; then expansion of the ignited charge to considerably more than its original volume before compression; then relief of pressure, followed by exhaustion of the remaining products of combustion; and, lastly, the simultaneous drawing in and compression of the fresh charge. A subsidiary claim is for a special arrangement of the rods and bell-crank, to allow of the working of the pump-plunger from the crank-shaft.

Regenerative Gas-Lamps.—Ribbans, E. C., of Ipswich. No. 14,748; Sept. 18, 1889. [8d.]

This invention relates to improvements in regenerative lamps provided with inverted gas-burners. It primarily consists of an addition to a Siemens lamp, whereby it may be used out of doors, or in draughty places; the addition preventing a downward current of air from having practically any effect upon the light given by the lamp.



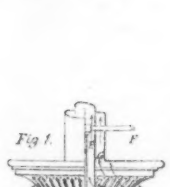
The illustration is a section showing the improvements applied to a Siemens regenerative gas-lamp. Around the lower part of the lamp (which is of greater diameter than the upper part or chimney), there is placed a cylindrical casing B, the upper part of which, or that part at

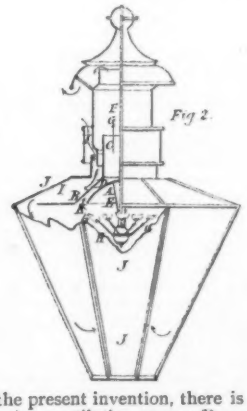
or about the level of the junction of the two diameters, is coned or bent inwards. To the exterior of the cylindrical casing B at or near the bottom of the coned part, is attached a perforated plate C, which forms part of a bend or bulge D. To the perforated plate is attached the upper part of the framing of the lantern E; the upper part is perforated. A bend or angular deflecting-ring F may be fixed to this upper part of the framing of the lantern, being below the perforations in it and in the outer part of the plate C. The air surrounding the lamp passes (as shown by the arrows) through the perforated upper part of the lantern E and through the perforated plate C, and also through perforations in the external part of the bend or bulge D into the interior of the lamp; the air being guided or deflected by the cone on the cylindrical casing B. A portion of the air which passes into the upper part of the framing of the lantern is guided by the deflecting-ring F, and passes downwards to supply the burners with the air necessary for combustion. To the upper part of the bend or bulge D is attached a cylindrical ring G, perforated for the passage of air; and to the upper portion of the perforated ring is attached a flanged cone H, which surrounds the upper part of the chimney of the lamp. To the flange of this cone is fixed another cylindrical ring I perforated for the passage of air; the flanged cone H serving also to deflect the air passing through the perforated cylindrical rings G and I. The perforated ring I has fixed to its upper end a flange cylinder J, the flange of which may be bent downwards and round the perforated ring I. The upper part of the flanged cylinder J is perforated, and is provided with a perforated flange, to which is attached a solid cylindrical ring or guard K, extending sufficiently downwards to cover the perforated upper part of the flanged cylinder J. The solid cylindrical ring or guard K and the flanged cylinder J are surrounded by an outer perforated or slotted cylindrical guard L; and at right angles to the flanged cylinder J is fixed a solid ring or annular projection, which serves to additionally promote the passage of air through the upper perforated parts of it. Above this flanged cylinder are arranged a number of superposed rings M, the spaces between which serve as exits for the air which has been drawn into the lamp and for the products of combustion. These superposed rings are themselves surrounded by a perforated cylindrical ring N, to the top of which is attached a solid cone O, joined to a solid cylindrical ring P. Over the cone O, or over the cylindrical ring P, is placed a cap Q; and the space between the cone O and the cap Q, or between the cylindrical ring P and the cap Q, serves as the final outlet for the heated air and the products of combustion. The perforated ring N surrounding the superposed rings serves to admit fresh air, and also permits of the escape of some of the heated air and products of combustion.

When a downward draught or current of air gets into the upper part of the lamp, it rushes down, and is deflected outwards by the cones, and passes through the perforated cylindrical rings I and G into the surrounding air, little or none of the downward draught reaching the lamp itself. Some of the downward current flows through the perforations in the bend or bulge D, the plate C, and the upper part of the lantern E; but the greater part passes, as already stated, through the perforated cylindrical rings I and G., &c. By the same arrangement of perforated cylindrical rings, a constant stream of fresh air passes into the interior of the lamp, deflected in the proper direction by the cones, and keeping the lamp cool. The gas may be supplied by pipes placed each side of the lamp, as shown by dotted lines.

Non-Regenerative Gas-Lamps.—Stott, J., of Fleet Street, London. No. 14,884; Sept. 20, 1889. [8d.]

This invention relates to improvements in that class of gas-lamps in which the heat from the burners (preferably placed at an angle with the vertical) rises up into a dome placed above them, but in which there is no hole or outlet. The current of heat therefore descends from the dome to find an escape; and in doing so, impinges upon and depresses the gas-flames, so that they assume a flattened or nearly horizontal shape. The flow of the current of heat also causes the flames to become highly heated, and so produces an increase in the illuminating power. In such lamps, an objection has been found to their use in consequence of the heat formed by the burners not being distributed equally over the inside and outside surfaces of the deflector, thereby causing a tendency of the enamel to crack. Another objection is that there is no outlet provided for the escape of the products of combustion and heat.





According to the first part of the present invention, there is placed over the dome or deflector A (fig. 1), a ventilating canopy B, supported by an outlet-shaft C, carrying off all the products of combustion, which pass up round a circular passage D in close proximity to the outside surface of the dome, and maintain the outside at a temperature nearly equal to that of the inside, and prevent the cracking of the enamel due to difference of temperature.

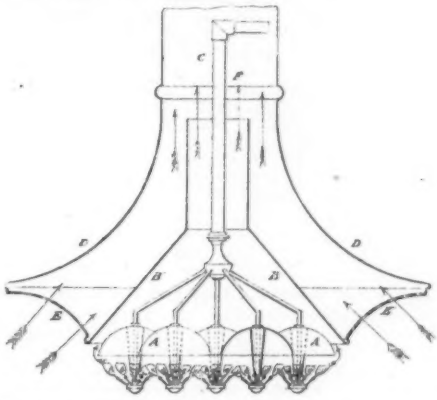
The second part of the invention refers to the dome or deflector A, which is formed mushroom shape (as in fig. 1), with a hollow conical or tapered stem E; the smaller part of the stem being carried down to the lower end of the supply-pipe F near the burners G.

According to the third part of the invention, the dome or deflector A is coated with asbestos, slag wool, or other non-conducting material on the outside, in order to maintain the heat and guard against cold currents of air coming in contact with the outer surface. This non-conducting material may have an outside cover of metal, if desired.

The fourth part of the invention refers to the adaptation of the improvements to a street lamp or lantern, as in fig. 2. The lamp consists of the burners G and the dome or deflector A, suspended from the supply-pipe F in the upper part of the lantern J. The lower edge of the ventilating canopy B at K is carried down below the level of the edge of the dome A; the object being to guide the heated air and products of combustion from the burners up the shaft C. The space I between the upper surface of the outlet shaft and canopy C and B, and the upper portion of the exterior casing of the lantern J, forms the passage for the current of air necessary to feed the lights in the lamp at G, as shown by the arrows. The passage of this feed-current over the heated surface of the ventilating shaft and canopy C and B is said to have no effect in correcting the tendency of the glass or other outer casing of the lantern becoming overheated.

Sun-Burners.—Stott, J., of Fleet Street, London. No. 14,929; Sept. 21, 1889. [6d.]

The object of this invention is to effect an improvement in Thorp's non-regenerative gas-light (patent No. 10,698, of 1886); and relates to lamps of the sun-burner type, provided with means for ventilating and carrying off the products of combustion.



The patentee proposes to suspend two or more cluster lights A (of the "Thorp" system) from a central supply-pipe F, and enclose the whole cluster in a conical shaped cover B, up which the products of combustion pass to a ventilating-shaft C, from which the outer cover D is suspended, and is connected with the inner cover and shaft B by a ventilated rim E. The contour of the inner cover B is such as to form a passage around it in close proximity with the domes or deflectors A; thereby maintaining a high temperature on the outside of the deflectors, and guarding against the access of cold currents of air, in order to prevent the cracking of the enamel on the inside of the deflectors due to difference of temperature. The deflecting domes A are of mushroom shape, with a hollow conical enamelled stem, which increases the reflecting properties of the domes, as described in patent No. 14,884 of 1889. The domes may also be covered on the outside with a non-conducting substance, in order to maintain a nearly equal temperature inside and outside.

APPLICATIONS FOR LETTERS PATENT.

12,476.—Lewis, R. W., Lewis, T. S., and Lewis, W. H., "Improvements in joining or connecting tubes or pipes for conveying liquids, steam, gas, or compressed air." Aug. 9.

12,523.—Stuart, C., "Improvements in reducing valves for steam, air, water, or gases." Aug. 11.

12,584.—Hawkyard, J., and Braddock, J., "Improvements in apparatus for supplying gas or other fluid on prepayment." Aug. 12.

12,660.—Thomson, A. B., "Thomson's patent gas-iron for tailors, laundresses, hatters, &c." Aug. 13.

12,661.—Dempster, R. and J., "Improvements in apparatus connected with the manufacture of sulphate of ammonia." Aug. 13.

12,690.—M'Ghee, G., and Burt, P., "Improvements in and relating to gas motor engines." Aug. 13.

12,712.—Leoni, S., "Improvements in gas cooking-stoves." Aug. 13.

12,851.—Switzer, S., "An improvement in atmospheric gas-burners." Aug. 16.

12,859.—Robinson, W. G., and Plumb, F., "Improvements in the method of and means for automatically supplying oils and combustible liquids to self-generating oil-gas burners." Aug. 16.

12,860.—Key, J. T., "Improvements in the process of, and apparatus for, manufacturing gas, and for the utilization of the same." Aug. 16.

12,861.—Robinson, A. E., and Robinson, H., "Improvements in gas or combustible vapour engines." Aug. 16.

12,881.—Borradaile, T. S., and Joy, A., "A combined self-regulator and stopcock for gas, water, or other fluid." Aug. 16.

12,895.—Hay, A. M., "Improvements in the process and apparatus for producing oil water gas." Aug. 16.

12,903.—Younie, A., "Improved construction of gas-stove, and in means for grilling and general cooking purposes." A communication from F. R. Robinson. Aug. 16.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by correspondents.]

Gasholder Construction.

SIR,—I have only a few words in reply to Mr. Cripps's further very voluminous remarks on this subject in your last issue. He assumes the thing which is not. I have never yet claimed to be the first to suggest, as an *abstract proposition*, the mere desirability, or even a faith in the possibility of constructing holders without external or upper guidance. I simply claim to be the first to discover, formulate, and propose an *actual mode* whereby this end could be realized. I have fully conceded—surely, often enough—that Mr. Webber had an *aspiration*, if he had not an inspiration. A strong belief that the framing might be reduced greatly was certainly in his mind; and doubtless he had hopes this would eventually be abolished. But his proposed plan did not "to all intents and purposes" abolish this; nor have his writings anywhere shown any means whereby such could be accomplished.

Long before the electric light, the telephone, and other discoveries or inventions were accomplished facts, they were suggested as possibilities, or as dreams; but "history" does not accord the credit of these things to such vague speculations upon future events. There is all the difference between general prophecy and specific performance in the two kinds of propositions. One is only a faith without form; the other becomes a working scheme. A writer of "true history" can discriminate. What I have claimed, and continue to claim, is, that I was the first to discover and propose a plan for the purpose—no more, and no less. If this is not true history, let Mr. Cripps find the *other plan*. All his unnecessary and laborious quotations recoil upon himself, and prove up to the hilt the truth of my claim.

I am glad Mr. Webber now sees that his remarks at Ryde were scarcely just. I am not "disposed to arrogate" almost everything to myself. I only claim my own work; and surely this is right. I am indifferent to Mr. Cripps's opinion on this point, because he is not personally interested.

I think all fair-minded persons will see the simple truth of the foregoing; and I will add that although I should hate myself if I desired to take one feather's weight of credit for another's work, I think it a most pitiable kind of thing, though in some sense no doubt amusing, to see such zeal employed to try and take away, or to minimize to vanishing-point, the credit of an invention which has been so fully and officially acknowledged, the world over, as unusually original, both as to conception and the means of carrying out the same. If this kind of task is congenial to our friend, it is much to be regretted for his sake.

W. GADD.

Manchester, Aug. 20, 1890.

Mr. Gadd's Gas Institute Paper and Mr. Cripps's Criticism.

SIR,—When Mr. Gadd practically accuses others of ignorance, and then professes to instruct them with a paper he represents as mathematically exact, he must be prepared for "hard knocks," particularly when the paper proves to be altogether erroneous. At any rate, he has little reason to complain of the compliment he bestowed upon others being returned npon him in so effective a manner as Mr. Cripps has succeeded in doing. The misrepresentations contained in Mr. Gadd's letter of last week, particularly in the second paragraph, will, I should think, be apparent to all experienced engineers.

C. E.

Aug. 21, 1890.

SIR,—Although I am not fond of verbal warfare, I am somewhat interested in the scientific investigation of the strains upon, and the construction of gasholders. I should therefore be greatly obliged to Mr. Gadd if he will explain clearly how he intends figs. 3 and 4 in his paper to be understood. I can quite understand Mr. Cripps's figures and explanation of the matter, but I fail to interpret Mr. Gadd's meaning. Mr. Gadd said that the reason for the fourfold strength of the posts "can be readily demonstrated from figs. 3 and 4" in his paper. Will he kindly say how this is to be done?

INQUIRER.

Aug. 22, 1890.

Benson and Others v. Chandler and Others—The Case Settled.

SIR,—With reference to the report of the proceedings in the above case, given in your issue of the 12th inst., I am pleased to be able to state that the matter in dispute has been amicably arranged, and that Mr. Benson has a seat at the Board of this Company.

SIDNEY HERSEY,
Managing Director, Kirkham, Hulett, and Chandler, Lim.

Palace Chambers, S.W., Aug. 22, 1890.

Bills Royal Assented.—On Monday last week, in the House of Lords, the Airdrie and Coatbridge Water Bill, the Electric Lighting Orders Confirmation Bill (No. 15), and the Tottenham Local Board Bill received the Royal Assent by Commission; and Parliament was prorogued.

The Chester Town Council and Electric Lighting.—At the last monthly meeting of the Chester Town Council, the Watch Committee recommended that the Bill confirming the Provisional Order authorizing the supply of electricity within the city having received the Royal Assent, be referred to the Committee to report as to the course most advisable to take for putting the powers of the Order into execution. Alderman Frost remarked that he thought it would be well to inquire as to the towns where electric lighting was in existence, and if it paid. If it was a source of loss, it would not, he said, be a wise thing for the ratepayers to have to make up an annual loss. Alderman Gilbert pointed out that the step they were taking that day was merely to instruct the Watch Committee to glean information, and to bring it before the Council. Mr. Farish said it would be in the memory of the Council that this matter was tentative from the beginning; and the Watch Committee had no intention, so far as he could gather, of hurrying the Council into any hasty steps. They had a gas company; and he thought they were fairly well supplied with gas. It was, however, a great pity the Corporation did not possess the gas and water works. The recommendation was then agreed to.

MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the Bridge House Hotel, London Bridge, last Wednesday, under the presidency of Mr. GEORGE LIVESEY, who, on entering the room, received a cordial greeting.

The SECRETARY (Mr. Frank Bush) having read the notice convening the meeting, and also the minutes of the previous meeting, the report of the Directors, which was given in the JOURNAL for the 12th inst. (the accounts appearing last week), was taken as read.

The CHAIRMAN then moved—"That the report and accounts now presented be received and adopted, and the report entered on the minutes." He said the report was not of the rosy character to which the shareholders had for many years been accustomed; but he did not think they need be downhearted on this account. There had been "ups and downs" even with gas, though the present generation of proprietors had had such a long period of continued progress and prosperity, that it was possible they might have the idea that gas was different to all other human things, and that adversity was unknown. This, however, was not the case; for in the last 40 years there had been periods of depression. In 1850, when all the Companies were in competition, two new Companies were started—one on the north, the other on the south of the Thames; and the result was that the price of gas was largely reduced, dividends were also materially decreased, and things looked rather black for the Companies. Good, however, came out of it; for at the instigation of one of the principal promoters of the Southern Company—Mr. John Thwaites—the districting system was adopted, which resulted in great good both to the Companies and the consumers. Seven or eight years later—in 1859 and 1860—there was an agitation on the part of the authorities. The result of this was the passing of the Metropolis Gas Act of 1860, which also benefited the consumers and the Companies, confirmed the districting arrangements, and enabled the Companies to pay largely increased dividends—back dividends. This caused a further disturbance. In 1866, 1867, and 1868, there was another agitation, with a parliamentary inquiry; and persons were in fear that gas property was going down; and so it did for a time. The result of this was certain legislation, which did not prove successful when it came to be tried. The price of gas under the City of London Gas Act of 1868 was fixed at 3s. 9d., with a provision for an increase of price on application to the Board of Trade. In 1872, 1873, and 1874 came the coal famine. An appeal was made to the Board by the two largest Companies in London, with the result that they were empowered to raise the price of gas very much indeed. This caused further dissatisfaction; and the system under which they acted was condemned from that time. It was this, in fact, that led him (Mr. Livesey) to propose the sliding scale; and since 1875, when this system was adopted, they had had peace with prosperity. They had had no contention, and nothing but progress and prosperity had attended the Gas Companies. Now had come a time when the wheel of Fortune was going downwards with them; but that they would rise to the top again, he had not the slightest fear or doubt. How this was to come about he could not say; for he was not going to venture into the region of prophecy. They had a solid business; and as in years gone by, they had successfully passed through periods of depression, so now they would doubtless do so, and be left in a stronger and better position than ever. He would now turn more particularly to the business of the meeting; and on this he might say that really the special features of the accounts presented on this occasion might be summed up in two or three words—the extra expenses of the strike. He thought it was necessary to remind the proprietors that this was a very arduous struggle, into which the Directors were forced. The men demanded something that was utterly unreasonable—that the Directors should, in fact, dismiss 1000 loyal men, and abrogate the agreements into which the Company had entered with these men. The Directors could do neither the one nor the other. They could not dismiss the men, nor would they under any circumstances; and rather than dismiss them, the works should have been shut up. They had had four Unions to contend with. On the very day their men left them, the coal porters also left without warning; and consequently they had to unload their coals as best they could. This was a difficult matter; but they did it. Then the lightermen were against them, and would not work the barges; and unless the Directors had had a few men of their own on whom they could rely, they would have had great difficulty. This had entailed on them very much larger expenditure, as, anticipating difficulty, they had arranged for getting coal by railway; and in the present half year coal had cost them £10,000 more than it would have done owing to their having made this provision, and purchased these coals from Yorkshire. Then they had the Seamen's and Firemen's Union against them. They said: "As the coal porters have left you, no men shall work ships to be discharged by your men." The consequence was that crew after crew was taken from these vessels. The Directors succeeded, however, in getting other crews; but at the very time when the Seamen's and Firemen's Union were fighting the Company, as they did for two months, our friends north of the Thames were sending orders to their contractors at Newcastle to employ only members of the Seamen's and Firemen's Union. This increased the difficulties and the expenditure of the South Metropolitan Company. All these facts he brought before the proprietors as the explanation and justification for the expenditure that had been incurred. He feared that he must take upon himself a considerable amount of responsibility in regard to this outlay; for he was lavish in the spending of money. He said to their officers: "Do not mind what it costs, so long as you succeed. I will forgive anything, so long as you do not fail." This might have been a rash course; but it was thought necessary at the time to take every possible precaution. Everyone said that there was no chance of their having another strike. The strikers themselves had come to him and said: "You may depend upon it that you will have no more strikes. We should not have struck had we not felt sure that you would give in in two or three days; but having shown that you can do without us, you will never have another strike."

He was, however, certain that if such a thing did happen again, they would be able to carry it through—he was going to say at a tithe, but certainly at a quarter of the cost which the late strike had entailed on them. They were well known now as a Company that could be trusted. Employment with the Company was earnestly and anxiously sought after, not only by men in London, but all around London and in the provinces. Men had found that the Company could be trusted and relied on; and they had only to hold up their hands to get any number of men they required. Something was said on the last occasion about the police; and after the meeting a shareholder wrote to him, and expressed a hope that something might be done for them. He must say that the police on that occasion acted in the most masterly manner. Their justification for doing what they did was this: The Company had made arrangements for bringing into the works several thousand new men; and the strikers had made arrangements to oppose their entry. There were at the time enormous bodies of men in the streets of London who were opposed to each other; and if there had not been an overwhelming body of police, an experienced Superintendent had told him that the new men would have been "eaten up." If the police had not acted as they did, there would have been very serious riots going on in three or four places at the same time in South London. The Company wished to show their appreciation of the services of the police. But they had found it was impossible to do so individually, the numbers engaged being so great; and after consulting with the Chief Commissioner and other officials, it was decided that the best plan would be to make a present to their funds. Accordingly, a cheque for £600 was placed in the hands of the Chief Commissioner, to be divided equally between the three funds of the force—the orphanage, the distressed members', and the widows' funds. This, however, was not in payment for the services rendered—the police authorities stating that they were bound to do what they did—but was given as an expression of the Company's appreciation of the hearty and thorough manner in which the police did their duty. The direct cost of the strike was put down in the revenue account at close upon £32,000. In consequence of the possibility of the coal supply being interfered with, they purchased a large quantity of Yorkshire coal by rail; and this, with other expenses due to the strike, had made the item for coals considerably more than it otherwise would have been. Then there were other indirect expenses—such as repairs, maintenance, and wages. They had felt it necessary to do a great deal of work that need not have been done at the time; but they had incurred this outlay for the purpose of finding employment during the summer months for the new men, and for such of the old men as were worthy of it. Then there was a loss of business owing to their inability to give a full supply of gas. Had there been no strike, the profit, instead of being only £59,000, would have been sufficient, within £20,000 or £30,000, to pay the full dividend; and the deficiency they would have felt justified in taking out of the reserve fund, without any thought of increasing the price of gas or troubling about it. He drew attention to this because the accounts now presented, and those of the previous half year, must be taken as entirely exceptional. Happily all the expenses connected with the strike were past and gone. It had cost the Company a very large sum; but it had been worth all it had cost them. Now, the outlay was all over; and they started, so to speak, with a clean sheet. It was true that their reserve fund had been dipped into rather extensively; but they had still a large amount left. With reference to their prospects, the only question was that connected with the price of coal. They had made contracts for coal at an advance of 5s. a ton on what it was two years ago, free on board; or 4s. a ton beyond what it was last year. This was a serious addition to their expenditure. The Directors had been very greatly surprised at the price of coal not falling in the summer; but, watching the market as they did, they found that while coal for manufacturing, domestic, and other purposes fell, gas coal kept up its price. This puzzled them very much; but it was at last explained by the fact that the gas companies—The Gaslight and Coke Company particularly—were stocking largely in the summer months. In fact, their friends on the North had 263,000 tons in stock in June last, against only 63,000 tons in store in June, 1889. This had created a demand for coal in the slack time, and consequently stiffened the prices. They themselves, however, had waited. The price three months ago was 13s., or (say) 12s. 6d. a ton. By waiting until last month, they had succeeded in obtaining their coal at 11s., representing a very considerable saving. To do this, however, they had waited till every contract had run out. They had a few arrears to receive; but their contracts ran out at the end of June. It might be said that this was rather a risky thing to have done. But they had run the risk; and the result had been that they had bought coal at about 1s. 6d. a ton less than if they had made their purchases at the usual time of contracting. As to their dividend, a shareholder had written to the Secretary saying that he did not think they were justified in declaring a dividend of 12 per cent. per annum. He wished it to be perfectly understood that the dividend on the capital raised since 1876 was not 12 per cent., but was purely nominal. The Board of Trade, at the instance of Sir Thomas Farrer, said at that time: "We do not want the public at some future day, when they purchase the gas undertakings, to pay on an exaggerated capital. These allotments of capital to the shareholders at par must be stopped; and all new capital must be sold by auction, so that the public, when they buy, shall not be saddled with a large amount of high-dividend capital, but shall only purchase capital which is carrying a moderate dividend." By selling their stock by auction, the dividend, instead of being 12 per cent. per annum, was only about 5 per cent.; and he wished this point to be clearly understood by the public. For the great bulk of the shareholders who had bought their stock since 1876, the dividend was also only about 5 per cent. He considered that they were perfectly justified in using their reserve fund to make up the 12 per cent. now recommended—in fact, they would be justified in making it more. The price at which they sold gas entitled them to pay 13¼ per cent.; and if they chose to take out of the reserve fund an additional £15,000 to make up the 13¼ per cent., they would be perfectly justified in doing so, because the dividend was governed by the price at which they sold gas. The Directors, however, asked the proprietors to forego this £15,000, in order to meet the direct expenses of the strike—half being taken from the insurance fund, and half from the dividend. Their reserve fund was created and existed solely for the purpose of an event like that in question. He could not remember the time when the reserve fund had had to be dipped into—at any rate, they must go back to 1872 or 1873. When the last coal famine occurred, the reserves had to be trenched upon; but since then the Companies had not touched their reserve funds—at all events, the South Metropolitan Company had not done so; having, in fact, been adding to it. It was therefore perfectly legitimate for them to use their reserve fund to make up for the deficiency of the dividend. They might say: "Why should you not raise the price of the gas?" His reply was that the reserve fund was to enable them to tide over periods like the present without raising the price. The intention was that it was to help the shareholders and the consumers alike. If, however, coal should for any long period keep up to its present figure, which they did not expect, it would be absolutely necessary to call upon the consumers to bear their proportion of the additional expenditure. The Directors would watch the matter very closely, and not allow the interests of the proprietors to be sacrificed in any way. They felt that the reserve fund—which would amount to nearly £200,000 after taking from it the sum necessary to make up the present dividend—might be dipped into very largely before it would be necessary to increase the price of their gas. There was one other matter to which he must refer; for he had rather misled the proprietors on the last occasion. A question was asked about The Gaslight and Coke Company's action; and he stated that the feeling manifested at the meeting of that Company in February, by the Directors and the shareholders, was of such a friendly character that he thought they would hear nothing more about it. In fact, the shareholders at that meeting distinctly recommended the Directors to drop their claim for damages. This claim ought never to have been made. The Act of 1860 and the law as laid down by Lord Cairns and the general practice of all the Gas Companies was on the side of the South Metropolitan Company, as was proved by what occurred in the Court of First Instance and the Court of Appeal, which confirmed their Company in the possession of the supply to the goods yard of the Nine Elms Railway Station. The House of Lords had really reversed the law—limited and restricted the meaning of the Act of Parliament which, as clearly as words could do so, gave the South Metropolitan Company the right to light those premises; and they said that henceforth the Company must not light them. He contended that, under these circumstances, it was not a case for damages; and in making this claim, he thought The Gaslight and Coke Company showed that they were not actuated by the friendly spirit which ought to animate two such Companies. After their last meeting, he had thought that they would hear no more about this claim; but The Gaslight and Coke Company had pressed it to the utmost. Previous to the last meeting, they had made out their claim as £7200. It cost that Company according to their own accounts, upwards of 1s. 6d. per 1000 cubic feet to make the gas; but for the purpose of estimating these damages, they struck out many of the items of expenditure, and reduced the cost to 11¼d. per 1000 feet. On this basis, The Gaslight and Coke Company calculated that the South Metropolitan Company ought to pay them £7284. This was the statement sent in on the 18th of October last. The Directors could have acted as the shareholders wished, had they had the will; but they pressed the matter. They thought, they could improve upon this charge of £7284; and so they made a fresh calculation, increasing the amount to £7530—adding a paltry £300 to their previous extravagant charge. The Referee, however, did not allow it, but struck £1700 off the claim; making the amount £5800. All he (Mr. Livesey) could say was, having had a long experience in connection with gas, that this matter had been fought in the most unfriendly way he had ever known; and remembering all the circumstances, he would far rather be in the position of the South Metropolitan Company, to pay the money, than in the position of The Gaslight and Coke Company, to exact it. He now came to the concluding part of his speech, which he hoped would be satisfactory. First, in regard to their workmen, he was able to say that in all his experience, he had never known the relations between the Company and their workmen to be on such a satisfactory, friendly, and cordial footing as they were at this moment. At a large meeting of the workmen, convened entirely of their own motion, three weeks ago, to which they invited the Directors, in order to pass a resolution expressing their appreciation and thanks for the treatment they had received, man after man got up and uttered sentiments which did themselves honour, and cheered the Directors to a greater extent than he could express. The Engineers at the various stations informed them that the men were doing their work so cheerfully and heartily that they really required no looking after. This fact spoke very highly for working men, if they were treated fairly and honestly. If they could only be induced to trust one, they would work loyally and cordially. He was very glad to bear testimony to the good feeling of the men. The foremen now found it a pleasure to go about the works, for everything was working smoothly. Another satisfactory matter he had to refer to was the action of the consumers, who displayed the greatest possible forbearance and kindness to the Company during their difficulties. They had to give them a short supply of gas for a considerable period, and to work at low pressure. Numbers of the consumers provided themselves with lamps and oil, and informed the Company that they would do all they could to assist them. Since their last meeting, he had heard from all quarters that this help was cheerfully rendered; and no question had been raised by the consumers about paying their accounts. The parishes had acted in the same way. Since the Company had been able to furnish the consumers with a full supply, a large increase had taken place in the consumption; the advance having been 5 per cent. over the corresponding period of the previous year. The use of gas-stoves was largely increasing; and with this feature in their business, and the appreciation of gas shown by their customers using it for all the varied purposes to which it was applicable, he thought they might look forward with hope and confidence to a future of great prosperity. The Directors would not neglect any opportunity of improving the position of the Company. Labour was very dear; and they would be perfectly justified and right in adopting such labour-saving appliances as would economize the cost

of production. They had been too busy to do anything in the past half year except to manage their business; but if any new methods of making gas—such as water and oil—could be introduced with advantage, every attention should be given to the matter, and the South Metropolitan Company would not be behind in adopting any new processes.

Mr. SIMPSON ROSTRON, in seconding the motion, endorsed the words of the Chairman in regard to the recent meeting of their men. He remarked that, for the first time in the history of the Company, it might be said that the workmen knew that their interests were identified and identical with those of the proprietors. He thought this was a very important factor in the future prosperity of the Company.

Mr. GROVER, while congratulating the Directors, thought the progress of the Company in regard to the consumption showed that the last reduction in the price had not been altogether a success; and he considered it would be desirable to reimpose the 2d. which had been taken off.

A SHAREHOLDER asked if the dividend was included in the motion before the meeting.

Mr. FRANKLIN suggested that the Chairman should refer to the question of the residual products.

The CHAIRMAN, in reply, stated that the dividend would be dealt with in a separate resolution. In the June half of 1889 they received £121,000 for residuals; and in the past half year, they had obtained nearly £137,000. This was an increase of £15,600; and he hoped there would be a still greater improvement in the current half year. They had received £12,000 more for coke, and £5000 more for tar; but for ammonia they had obtained rather less. The time had not come for raising the price of the gas. He held that it was their sheet-anchor that they should keep the price down. They did not want to play into the hands of the electric light or the oil people; and by keeping their price down, they would be able to convince the consumers that gas was their best friend. The interests of the shareholders, however, should not be sacrificed. He would not mind using up all the reserve fund, if they could see their way to keeping the price at its present figure, until the extra cost of coal came down again. They would not, however, wait until the whole of the reserve fund was gone before raising the price. Possibly £50,000 might be taken from the reserve fund next half year, in consequence of the increased cost of coal; but they would still have nearly £150,000 left.

The motion was then put, and carried unanimously.

The DEPUTY-CHAIRMAN (Mr. J. Mews) next proposed, and Mr. ROSTRON seconded, the following resolution: "That a dividend at the rate of 12 per cent. per annum be now declared, and that such dividend, with the exception of the sum of £250, be apportioned amongst the three classes of stock as prescribed by the Scheme of Amalgamation, 1880; and that the warrants be transmitted to the registered addresses of the proprietors by post."

Mr. MACE said he did not question the wisdom of the Directors, in whom he had the greatest confidence; but, so far as he understood the matter, he thought it was unwise to take so much from the reserve fund for the dividend.

Mr. BEARD differed from the last speaker, who, he said, appeared to have forgotten the increase in the expenses consequent on the strike. He thought the Chairman was perfectly right in adhering to the determination not to raise the price of the gas. From what Mr. Livesey had said, he Mr. (Beard) regarded the present position and prospects of the Company as satisfactory.

The CHAIRMAN, in reply, repeated that the reserve fund existed for the purpose of making up the dividend. The money was locked up, except in times like the present. If the undertakings were acquired by the County Council, they would lay their hands on this reserve fund; and he thought that the Company might as well benefit themselves and the consumers by using it. They took about £23,000 from the reserve fund to pay the last dividend, and they would take about £48,000 to pay the present one. He would not be surprised if next time they had to take £50,000 from the fund to meet the increased price of coal and pay a dividend of 13 or 13¼ per cent.; for if they kept their price at what it now was, he thought the shareholders were justified in expecting to go back to their full dividend. He had been very glad to see how cheerfully the proprietors had accepted, for the second time, a reduction of dividend. This would help them very much with the consumers and the parishes, and would show that gas shareholders were not the greedy persons they were sometimes represented to be.

The resolution was carried unanimously.

On the motion of Mr. CORBET WOODALL, seconded by Mr. PERRIN, a vote of thanks was passed to the Chairman and Directors.

The CHAIRMAN, in reply, said the proprietors had acted very kindly in receiving the Directors as they had done, although accounts were presented showing profits that were only half, or less than half, what they ought to be. Mr. Perrin had remarked—and it was perfectly correct—that if they had not succeeded in the contest which had been forced upon them, the workmen would have been their absolute masters. He afterwards proposed a vote of thanks to the officers, who had, he said, rendered the Company splendid service.

Mr. MACE seconded the motion, which was at once unanimously adopted.

The CHIEF ENGINEER (Mr. Frank Livesey), in reply, also testified to the admirable way in which the Company are now working with their men. Those who had left them, to their own sorrow, had been replaced by better men; and nearly every one of them had entered into the profit-earning scheme—their interests being now identical with the Company's, and they were free men.

The SECRETARY also replied, and the business terminated.

Presentation to Mr. George Livesay.

At the close of the proceedings at the general meeting, the Committee formed in pursuance of the resolution passed at the half-yearly meeting in February last to consider the best means of permanently recording the appreciation by the proprietors of the great services rendered by Mr. George Livesey to the Company during the trying period of the strike, brought their labours to a close by presenting to Mr. Livesey his portrait in oil (accompanied by a cheque for £1700), and to the Chairman and Directors collectively an illuminated address. During the business meeting the portrait and address, which stood on a raised platform behind the Directors' table, were under coverings; but immediately after its close, these were removed amidst cheers by the Honorary Secretary of the fund (Mr. A. G. Hounsham); and two beautiful works of art, suitably framed, were disclosed. The portrait, which is life size and half length, and represents Mr. Livesey standing with a roll of paper in his left hand, is the work of Mr. William M. Palin—a young artist who has already achieved considerable success as a portrait painter by his faithful reproduction on canvas of several members of the Institution of Civil Engineers. In the present case his work is meritorious for the truthfulness of the likeness, the natural expression of the features, and the easy and characteristic *pose* of the figure. Much artistic taste had been displayed in the preparation of the address, the design and execution of which were alike highly commendable. It was as follows:—

SOUTH METROPOLITAN GAS COMPANY.

Chairman:	*Deputy-Chairman:*
GEORGE LIVESEY, Esq., M. Inst. C.E.	JOHN MEWS, Esq., J.P.

Directors:

JOHN EWART, Esq.	ROBERT MORTON, Esq., M. Inst. C.E.
Capt. THOMAS B. HEATHORN, R.A.	SIMPSON ROSTRON, Esq., J.P.

ROBERT OWEN WHITE, Esq., J.P.

Chief Engineer:	*Secretary:*
FRANK LIVESEY, Esq., M. Inst. C.E	FRANK BUSH, Esq.

On the 4th of December, 1889, the delegates of the Gas Workers' Union demanded the abolition of the profit-sharing scheme, and that all the men, about 1000 in number, who had accepted it, should "be removed from the works;" which being refused, some 2000 stokers the next day gave a week's notice to leave their employment. These notices were accepted, for to have yielded to this demand would not only have been grossly unjust to the loyal men, but would have made it impossible to carry on the works to the satisfaction of the consumers, or to the advantage of the proprietors.

The Board, with the loyal and hearty assistance of their officers, determined to fill up the places of the stokers with new hands. This entailed an immense amount of labour and anxiety; but thanks to the determination and foresight displayed on all points, they were entirely successful, and were able to provide a new staff of stokers, who, with training, proved themselves competent for the work.

At the first meeting of proprietors held after these occurrences—viz., on the 26th of February, 1890, the following resolutions were passed:

That the sincere and hearty thanks of the proprietors be tendered to the Chairman (George Livesey, Esq.) and to the Directors of the South Metropolitan Gas Company, for the energy, courage, and skill they displayed under circumstances of great and unusual difficulty in successfully meeting the recent strike of the entire body of the Company's stokers. By their firm action they saved, although necessarily at great cost, the property of the Company and the lighting of South London; and by their example they have rendered very great service to other companies and traders employing labour largely.

That the proprietors do form a Committee to consider how the debt of gratitude to Mr. Livesey can best be recorded in some formal and lasting testimonial.

A Committee was named, with power to add to their number, and the result has been that a sum of £2216, from 1450 subscribers, has been received; the subscriptions being limited to two guineas.

At a meeting of the General Committee of subscribers to the "George Livesey Testimonial Fund," held on the 16th of April, 1890, at the Cannon Street Hotel, City, it was unanimously resolved:

That, on the closing of the fund, an illuminated address be presented to the Chairman and Directors of the South Metropolitan Gas Company.

That the balance of the fund be handed to Mr. George Livesey.

In pursuance of the above resolutions, the Committee, on behalf of the subscribers, desire to express their deep sense of the gratitude due to you, not only by the proprietors of the South Metropolitan Gas Company, but by the public at large, for the courage, firmness, tact, and good judgment with which you met and successfully overcame, under circumstances of great difficulty, the recent serious strike of the gas stokers in your Company.

Your action, although of great service to the whole community, was probably of the greatest benefit to the men themselves, who thereby received protection from an attempt to subject them to coercion in its worst form.

We also beg the acceptance of a portrait of the Chairman, which, we trust, will be placed in the Board-room, that it may serve as a reminder of the grave anxieties endured and successfully met by both the Chairman and Directors and officers of the Company on the occasion of the recent strike.

At the same time a sum of about £1750 will be handed to Mr. Livesey, for him to dispose of as he may think fit, and a copy of the portrait will be tendered to Mrs. Livesey for her acceptance.

We sincerely hope that you may long continue to guide the affairs of the Company, with advantage to the proprietors and the public, and to the well-being of the staff, both officers and men, employed in the service.

On behalf of the Committee,

W. H. WYATT, *Chairman.*

20th August, 1890.

Sir W. H. WYATT, in presenting the testimonial, referred to the splendid services the Chairman and Directors had rendered to the shareholders, to the whole community, and to the workmen themselves, in connection with the strike. To recognize these services, a fund was, he said, established, subscriptions to which were limited to two guineas—it being thought that a good number of subscribers was more to be aimed at than the collection of a large amount; though, seeing that no pressure had been used, and very little publicity given to the movement, they might be disposed to regard the result as very satisfactory—£2200 having been collected from 1450 subscribers. For a long time Mr. Livesey said he would not accept any personal present; but the subscribers at last rather "forced his hand," and told him that he must have a portrait of himself, which it was hoped the Directors would hang in their Board-room. Mrs. Livesey would also be asked to accept a copy of the portrait. They were further enabled to hand to Mr. Livesey an order upon the London Joint-Stock Bank for £1700, which would probably be increased by a further £50. He considered that the result of the action taken by Mr. Livesey in resisting the demand made by the stokers, had come out in an even better light in the last six months, in view of the shameful way in which others had given in who had had to meet strikes. He thought that the satisfaction of the Board and of the officers must be all the greater now, seeing that

the men were showing that they felt the battle had been fought very largely for them. The reduction of dividend was most cheerfully borne by the shareholders.

Mr. HOUNSHAM then called for three cheers for the Chairman—a request which was at once enthusiastically complied with.

The CHAIRMAN, in reply, observed that he felt totally unable to express his gratitude for the kindness which had been shown to him. It was extremely gratifying to him to find that such a friendly and kindly spirit existed. He certainly neither desired nor expected such an expression of feeling as had been displayed in connection with this testimonial. He could only thank the subscribers most heartily. He had merely done his duty. Unless he had had such thoroughly able and true colleagues as his co-Directors were, and unless they had been supported as they had been by such loyal servants as all those were who had remained true to the Company—and he referred not only to the chief officers, the foremen, and the clerks, but to the loyal workmen—he did not know where they would have been. While, however, it was very satisfactory indeed to find their work appreciated as it had been, it would be no satisfaction whatever unless they could feel that what they had done was right, and for the benefit not merely of the Company, or the shareholders, but of the consumers, the community at large, and last, though certainly not least, the workmen themselves. There had been a tyranny growing up which, had he been a working man, he would have felt to be perfectly intolerable. As his brother had put it, they had fought the battle for the free men. His colleagues, he might say, were pleased at the form the testimonial had taken, and at the highly artistic address. As regarded the cheque which had been handed to him, he had said all along that he did not want money, but that he wished it might be devoted to the benefit of the working people. He had been trying very hard to settle something definite by that day; but he had not succeeded. He thought it most likely that it would go to some hospital or convalescent home work. Referring to the kind proposition to ask Mrs. Livesey's acceptance of a copyof the portrait, he said the past year had been an exceedingly trying one to his wife, who had not known what might happen from day to day; and he really thought that her anxiety had been worse than his work. He thanked the Committee, the subscribers, and everyone who had anything to do with the testimonial, for the uniform kindness and goodwill which had been manifested towards himself and his colleagues. He hoped they would all continue to work for the benefit of the shareholders, the consumers, and the community generally.

Mr. ANDERSON inquired whether a small part of the balance left might not be devoted to giving each subscriber a photographic copy of the portrait.

The CHAIRMAN replied that they must hear what the Committee had to say on the matter.

The interesting and unique proceedings then terminated.

CROYDON COMMERCIAL GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Wednesday, at the Offices, Katharine Street, Croydon—Mr. C. NEWTON in the chair.

The SECRETARY (Mr. W. J. Russell) having read the notice convening the meeting, the report of the Directors for the half year ending June 30, was taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, alluded to the death of Mr. H. Palfrey Stephenson and Mr. J. S. Wright, who, he said, were two of the most valued members of the Board. Having expatiated upon the services rendered to the Company by these gentlemen, he said that, in consequence of their decease, the number of the Directors was reduced to five; and in compliance with a resolution passed by the shareholders about a year and a half ago, that there should not be less than six members on the Board, the Directors had elected Mr. C. Hussey, to fill the place of Mr. Wright. Proceeding, the Chairman stated that the increase in the business had not been quite equal to what it was in former years; but they did not stand alone in this respect—many other gas companies having had a similar experience. The additional quantity of gas sold has been 4,249,600 cubic feet, or nearly 3 per cent. The normal increase was from 4 to 5 per cent. As the charge for gas was reduced in the first quarter of the half year from 3s. to 2s. 11d., and in the latter quarter to 2s. 10d., of course, with only 4 million cubic feet increase, they could scarcely expect that the loss produced by these reductions in the price would be recouped; but it had been to such an extent that it was only £73 less. The increase, however, in the revenue from stove and meter rentals had turned this loss into a gain of about £20. Besides this, they had a larger increase in their receipts for residuals, than they ever had, so far as he could recollect, in the course of his connection with the Company. During the past three months, cookery lectures had been held once a week. The lectures were attended by large numbers of ladies, who appeared much interested in the information imparted to them. As a result, they had had a considerable increase in the use of cooking-stoves by their consumers. The Company had sold and fixed in the half year 264 stoves, in addition to a large number of other appliances for heating; and he had no doubt that, if they renewed the lectures from year to year they would find that cooking in the summer by means of gas would become almost universal among their customers. The outcome of the operations of the half year showed a sufficient balance to enable the Directors to pay the interest on the debentures and the dividends, and then to carry forward the respectable balance of £6264 to meet any contingencies that might arise. The Company were very fortunate in having entered into a contract before the rise in the price of coal took place, by which they were saving £10,000 a year; and, instead of having to increase the price of gas as had been done in many instances, he thought the Board would be able to maintain the present charge, and also keep the dividend at the same rate as during the past two years. In the course of his comments on the accounts, the Chairman said it would be noticed by the shareholders that nothing had been added to capital for new buildings or extensions. During the six months only £81 had been spent on mains, £148 on additional meters for new consumers, and £895 for gas-stoves. With regard to the revenue account, there was a decrease, as he had already said, of £73; but with the increase in the stove and meter rental, they had, compared with the corresponding half of last year, an advance of £20. The residuals—coke and tar principally—enabled them to take credit for £1663 more than in the first half of 1889. The total sum received in the six months was £39,655, against £37,969 On the opposite side of the account, it would be seen that coal had cost more, owing to an extra 400 tons having been used to produce the additional 4 million feet of gas sold. The item of purification was about the same. Wages exhibited an increase of £600—due to the augmented make of gas, the higher rate of wages paid to the men, and the fewer hours they worked. The item of repair and renewal of mains, &c., was a very large one, owing to the cost of fixing gas-stoves being charged under this head. Although this represented an expenditure of £618 out of revenue this half year, it was a continual source of increase. The total outlay was £1600 more than in the June half of last year; but notwithstanding, the net balance showed an improvement of £67. The balance of revenue would enable the Directors, by the aid of the interest on the insurance fund (now at its full amount), which must be placed to the credit of the net profit account, to pay the debenture interest and the dividends, and carry forward £6264. This, he considered, a very satisfactory statement; and he expressed a hope that the report presented at the close of the current six months would be equally as gratifying.

Mr. W. HYSLOP seconded the motion, which, after two or three questions concerning the accounts had been put, and satisfactorily replied to by the Chairman, was carried unanimously.

The CHAIRMAN next proposed the payment of the standard dividends at the rate of 10 per cent. per annum on the capital of £51,600, and of 7 per cent. per annum on the capital £137,500, and an additional dividend (under the sliding scale) at the rate of 4 per cent. per annum on the several classes of shares—all less income-tax.

Mr. MARSHALL seconded the proposition, which was agreed to.

On the motion of Mr. A. T. LAYTON, seconded by Mr. J. C. BENWELL, a vote of thanks was passed to the Chairman and Directors, and the officers of the Company for their services during the half year.

The proceedings then terminated.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The report of the Directors and the accounts of this Company for the past half year have just been distributed among the shareholders by the Secretary (Mr. Magnus Ohren). In the former it is stated that the result of the half-year's working shows a balance to the credit of revenue account of £7430. The decrease in the profit, as compared with the corresponding half of last year, is due to increased wages paid to the whole of the workmen, to large advances in the cost of coal and materials connected with the manufacture and distribution of gas, and also to the reduction made in the price of gas to 2s. 6d. per 1000 cubic feet from the Michaelmas quarter of last year. Coke and other residuals show an improvement of £2036; and there has been an increase of 2·41 per cent. in the quantity of gas sold over the corresponding period of 1889. The Directors record, with deep regret, the death, on the 30th of April last, of the Deputy-Chairman, Mr. Henry Palfrey Stephenson, who for some years occupied the position of Chairman, and was one of the original Directors of the Company. They also report that Mr. A. T. Layton has been elected by them to fill the vacancy thus caused on the Board; and that Mr. George Livesey has been elected Deputy-Chairman. Mr. Layton having resigned the office of Auditor, the proprietors will be called upon at the meeting to fill the vacant office; and it is reported that the following gentlemen, being duly qualified, are candidates for the office: Mr. Albert Helps, Mr. R. Hesketh Jones, Mr. Alfred Lass, and Mr. William Westcott. The Directors recommend the declaration of a dividend for the half year at the following rates per annum: 6 per cent. on the preference stock, 7 per cent. on the ordinary 7 per cent. stock, 10 per cent. on the ordinary 10 per cent. stock, and 7 per cent. on the new ordinary 7 per cent. shares, amounting to £13,625, less income-tax of £340. From the statement of accounts, we learn that the total gas receipts amounted to £46,906, and the meter and gas rental to £1066. The residual products yielded £16,932; and rents, £51. The total revenue was therefore £64,956. The expenditure totalled to £57,525; leaving, as mentioned above, £7430 as the profit. The sum at the credit of profit and loss account available for distribution amount to £22,415. During the half year, the quantity of coal carbonized was 40,186 tons, which produced 393,301,000 cubic feet of gas.

TOTTENHAM AND EDMONTON GAS COMPANY.

The report of the Directors of this Company for the half year ended June 30 last, to be submitted at the meeting of shareholders next Saturday, states that the accounts show an increase in the gas-rental of £4 18s. 1d. per cent., as compared with the corresponding period of last year; and the sale of residuals exhibits an increase of £1086. The sale by tender in April last of £10,000 "C" stock resulted in the Company obtaining a net premium of £6759. In order to provide for increased storeage, an extension of the coal-stores is now being carried out. The profit and loss account, inclusive of the amount of £4063 brought from the previous half year, gives an available balance of £9605, out of which the Directors recommend the payment of dividends, less income-tax, as follows: On the "A" stock, at the rate of 11½ per cent. per annum; on the "B" and "C" stock, 8½ per cent. These will amount to £5989, and leave a balance of £3615 to carry forward to the current half-year's account. From the statement of revenue, it is seen that £20,198 was produced by the sale of gas; the rental of meters amounted to £455; and the residual products realized £6007. Two or three minor items brought up the total income to £26,788. On the opposite side of the account, £15,567 was expended in the manufacturing operations; £1218 on distribution; £561 on the lighting and repairing of public lamps; £1466 was spent in rents, rates, and taxes; and £1580 in management. Auditors' fees, insurance, bad debts (only £48), and a contribution to the workmen's provident fund, bring up the total outlay to £20,528. A balance of £6260 therefore remains to be carried to the profit and loss account.

LIVERPOOL UNITED GASLIGHT COMPANY.

The Annual Meeting of this Company was held last Tuesday—Mr E. LAWRENCE presiding.

The report and accounts, of which an abstract was given in the JOURNAL last week, having been taken as read,

The CHAIRMAN moved their adoption, remarking, in the first place, that there was an old saying that, when a man ventured into the region of prophecy, he placed himself in a very dangerous position. He felt the truth of this saying that day more than usual, from the fact that six months ago he ventured to assure the shareholders and the public that by the end of the year then current a considerable increase in the price of gas appeared to be absolutely necessary. However, it would be seen from the report that the Directors did not now anticipate any necessity during the current year to raise the price. The reason for this was that circumstances had changed in various ways. Firstly, in making up the accounts at the end of the year, there was a larger balance in hand than was anticipated. Secondly, when they came to deal with the coming year, they found that coal would probably not cost quite as much as was at one time expected, and that in one or two quarters there would be a considerable reduction in expenses. These circumstances combined enabled the Board, without venturing upon prophecy, to express the hope that the present price of gas might be maintained during the current twelve months. With regard to the capital account, there had been comparatively little change. During the year, there has been paid off £23,000 of mortgages; and no occasion had arisen for the issue of any debentures to replace them. As to the revenue account, coal had cost £14,000 more than in the previous year. This arose from two circumstances—first, they had carbonized 5000 or 6000 tons more than in the previous year; and, secondly, the coal had cost on an average 8d. per ton more. The item for wages and gratuities at the works showed an increase of £5316, the bulk of which arose from the increase of wages on the scale arranged with the men some nine or ten months ago. The receipts for gas sold showed an increase of £7431, or as nearly as possible 2 per cent. for the year. There had also been an unexpected increase of revenue from the sale of coke; while tar had been sold at ¼d. per gallon higher than during the preceding year. The whole result was that, after paying interest and dividends, there was an available surplus of £10,084 to be placed against the extra expenses that would be incurred on coal and other matters. As to the future of their property, he believed that everything pointed to a very satisfactory position. He had never been one of those who pooh-poohed the question of electricity. He always recognized it as a most important factor, and could only say now, as he had done before, that there was nothing so far to cause the slightest uneasiness to the proprietors of gas stock. It was quite true that the consumption of electricity in Liverpool was increasing; and therefore to a certain extent the consumption of gas by those who had used it before was decreasing, but the decrease was by no means to be compared with the increase that was going on. For, in spite of what electricity had done, the consumption of gas during the past year had increased by 2 per cent. Of course, they must look to an extension of electricity; but they might just as safely conclude that other uses for gas would be found—that a steady consumption of gas would continue, and that the property of the Company would be just as safe now as it had been in the past. The Directors were thoroughly alive to the importance of keeping gas as cheap as possible; and he believed that as long as gas was maintained at anything like its present price they had nothing to fear. Certain efforts were being made in the present day to reduce the cost of the production of gas. The Dinsmore process was already in operation at Roby, Widnes, and other places; and if ultimately the Directors found there was in the process what was claimed for it, they would be in a position to give the public the advantage and benefit of cheaper gas. There was also another process which The Gaslight and Coke Company were prepared to try, but which had not yet come before the public. The result would be watched by himself and his co-Directors with great interest, because, if it turned out to be successful, they would not fail to take advantage of it. But it would be quite understood that considering the amount of capital they had invested in the processes they had already adopted, it would be the height of folly to attempt to make any change unless they were perfectly satisfied it would be a lasting one. He thought he might fairly ask the shareholders to join with him in congratulating their Engineer (Mr. William King) upon the successful manner in which he had handled his men during the trying times they had passed through. There had not been between the head of the works and his men the slightest friction. The differences had all been satisfactorily arranged; and so far as he knew, the best of all possible good feeling prevailed.

Mr. H. B. GILMOUR seconded the motion, which was unanimously adopted.

A resolution was then agreed to, declaring a dividend for the half year of 5 per cent. on the ordinary stock, and 3½ per cent. on the 7 per cent. "B" stock.

The retiring Directors and Auditor having been re-appointed, a vote of thanks was passed to the Chairman, and the proceedings terminated.

The Leeds Water-Works Undertaking.—Replying to the toast of his health, at the recent annual tour of inspection of the Leeds Corporation Water Committee, the Mayor (Mr. Alfred Cooke), who is also Chairman of the Committee, gave some interesting particulars as to the rapid strides made by the Water Department of recent years. He said that in 1852 the original cost of the water-works was £225,730. The total amount expended up to March 25, 1890, was £1,608,137, in new works, extensions, &c. The debt at the same date was £1,505,634; and deducting the sinking-fund moneys invested, amounting to £86,591, there was left a balance of £1,419,043. The income for the year ended August, 1853, was £14,173; for the year ended August, 1870, it was £44,330; while on March 25 last it was £96,451. Since the water-works were acquired by the Corporation, profits amounting to £113,949 had been paid into the borough fund in relief of rates.

PROVINCIAL GAS AND WATER COMPANIES.

The following paragraphs show the results of the working of various Provincial Gas and Water Companies during the periods mentioned.

Gas Companies.

In the report accompanying the accounts for the past half year which have been issued to the shareholders of the Brighton and Hove Gas Company, the Directors remark that the increase in the quantity of gas sold was nearly 6 per cent.; but, through the reduction of price which took place on Jan. 1 last, the amount of rental is practically the same. It may, therefore, be said that the result of this reduction is satisfactory notwithstanding a considerable increase in wages and cost of material. The revenue account shows that the total receipts amounted to £72,350, which sum was made up as follows: By sale of gas, £55,815; meter-rental, £1183; residual products, £15,291; and rents, £61. The total expenditure was £52,280, out of which the manufacture of gas cost £39,636; distribution, £5370; lighting and repairing of public lamps, £809; rents, rates, and taxes, £2160; management, £4000; depreciation fund for works on leasehold land, £35; and bad debts, £268. The balance transferred to the profit and loss account is £20,070. The amount of net profit to be carried to the next account, subject to the past half-year's dividend, is £38,854. At the meeting of the shareholders on the 5th prox., the Directors will recommend that dividends be declared upon the original "A" ordinary, and "B" preference shares at the rates of 11¼, 8¼, and 6 per cent. per annum.

The accounts of the Bristol United Gaslight Company for the half year ending June disclose an improvement in the income; but this has been obtained by the increased charge to the consumers for gas, and not from a growth of the consumption. The receipts from private consumers amounted to £69,883, as against £66,253; and from public lighting, £10,279, against £9124. Rental of meters and stoves produced £1579, as compared with £1390. Residual products yielded £22,647, in comparison with £18,783. Rents and transfer fees amounted to £267; making the total income £104,656, as against £95,780. There is a marked advance in expenditure. Coal stands at £39,762; being an increase of no less than £10,700. The whole outlay under the head of manufacture was £64,822, as against £57,668. The total expenditure reached £78,568, as compared with £70,469. The balance carried to profit and loss account is £26,088, as against £25,311. The balance of net profit available for dividend is £23,478, of which the proposed distribution of 10 per cent. on the ordinary stock will absorb £22,212. During the half year the capital expended was £9518, the two largest items of which were £6085 for new buildings and plant, and £2313 for new mains and service-pipes. The report of the Directors, to be presented at the half-yearly general meeting of the Company next Friday, states that, notwithstanding the continued high price of coals and other materials, the advance in wages, and the increased cost of the higher illuminating power of the gas now supplied by the Company above the requirements of their Act of Parliament, they are able, after providing for the maximum dividend of 10 per cent. allowed by the Act, to carry forward a balance of £1266 to the credit of the next half-year's account. They recommend the declaration of a dividend at the above-named rate. Resolutions will be submitted at the meeting for reducing the number of Directors for the future from eight to seven; and also for increasing the fees of the Auditors and the remuneration of the Directors.

At the half-yearly meeting of the shareholders in the Burnham (Somerset) Gas Company, held last Wednesday, the Directors recommended that no dividend be paid until the works had been put into a thorough state of repair and a reserve fund provided for. A portion of the work of renewal was directed to be commenced at once by laying fresh mains through several of the new thoroughfares. Application was made by Messrs. Willey and Co., of Exeter, to lease the works; but the offer was rejected.

Speaking at the meeting of the Castleford and Whitwood Gas Company yesterday week, the Chairman (Mr. J. Watson) said that during the past half year the cost of coal had exceeded that of the corresponding half of 1889 by £340, and other items of expenditure had also risen. There had been an increase in the sale of gas and residual products of £460; and the balance available for dividend was £1219. Out of this, the Directors recommended a dividend at the rate of 9 per cent. per annum, which would absorb £1127, and leave a balance of £92 to carry forward to the next account. The price of gas had not yet been advanced; but unless there was a large increase in the sale of gas, this would be necessary during the coming half year. The report and balance-sheet were adopted; and the dividend declared.

The shareholders of the Cork Gas Consumers' Company at their ordinary meeting last Tuesday had submitted to them a report on the operations of the past half year, which showed that under the head of receipts there had been small increases of £322 in the private, and of £39 in the public lighting; while residual products exhibited a substantial advance of £384, as compared with June, 1889. On the other hand, there was an increase in the cost of coal of more than £700; while labour and wear and tear was responsible for an extra cost of above £300. In consequence of the advantage derived from unexpired contracts, the Company, up to the present, had suffered less than many others from the extraordinary advance in the price of coal, which at the ports of shipment was, said the report, equivalent to more than 100 per cent. This circumstance had made it unnecessary for the Directors to adopt the course taken by several other Companies—viz., to increase the price of gas to the consumers; and this step they announced they would avoid as long as they possibly could. The shareholders were also reminded by the Directors that a Company, calling themselves the Irish House-to-House Electricity Company, applied to the Board of Trade for a Provisional Order to enable them to supply electric light in Cork. This application was opposed by the Corporation and by the Company; and the result was that the Electricity Company withdrew their application. They had, however, lately given notice to the Corporation that they intended to renew it. The report further stated that the Directors had allocated £350 to the depreciation account, which brought this fund up to £4785; and that they would soon have to make considerable demands on this sum for

apparatus worn out or depreciated. After this deduction, the balance of profit and loss amounted to £5473. The Directors recommended the usual dividend at the rate of 8 per cent., which would require £5701; and therefore to pay this it would be necessary to take £228 from the reserve, which would then stand at £11,988. The report was unanimously adopted.

The half-yearly report o the Directors of the Hartlepool Gas and Water Company states that there has been a considerable increase in the consumption of both gas and water during the past year; but the net gas revenue has been materially reduced by the enhanced cost of coal and labour, which will still further affect the revenue for the ensuing year. The Directors recommend the payment of a dividend for the half year at the rate of 7½ per cent. per annum on the "A" and "B" shares, and at the rate of 7 per cent. per annum on the "C" and "D" shares, in each case less income-tax, leaving about £1935 to be added to the floating balance. The Directors also report that they have succeeded in obtaining, during the present session of Parliament, an Act empowering the Company to purchase 20 acres of land for extension of the gas-works; and they have been fortunate in securing this quantity of suitable land close to the existing works, which will be utilized as circumstances require. Power has also been obtained to acquire by agreement 20 acres of land for the general purposes of the undertaking; but at present the Board do not propose to purchase more than the first-mentioned 20 acres. They have found it necessary to increase the storeage for water at the West Hartlepool works, to meet the increased requirements of the district for domestic purposes by the erection of an additional tower, which is in course of construction. The profit and loss account shows according to the balance-sheet, that the balance of net profit to be carried to the next account, subject to the past half-year's dividend, is £16,258, against £14,016 last year, when £9771 was paid as dividend. The capital expended to the end of June last was £366,239; and the total receipts, £365,336—leaving a debit balance on that account of £903.

The working of the Heckmondwike Gas Company during the past twelve months has resulted in a profit of £4071, as against £3564. This has enabled the Directors to pay the full dividends, and to carry forward a good balance to next year's accounts.

The net profit of the Kendal Gas and Water Company for the past twelve months amounted to £3771, which, after paying the preferential shareholders 7½ per cent., has allowed of the declaration for dividend to the ordinary shareholders of 8 per cent.; leaving a balance of £875 to be carried to the renewal fund, which will stand at £1920, after writing off £1156 from the redeemable renewal fund.

The profits of the Milnrow Gas Company on the past six months' working amounted to £589, which with the balance brought forward made the sum available for division £683, out of which the Directors recommend a dividend at the rate of 8 per cent., free of income-tax. The accounts show receipts from gas and meter rents of £1548.

The annual report of the Directors of the Morecambe Gas Company (which has been distributed among the shareholders by the Secretary and Manager, Mr. W. Duff) commences by congratulating the shareholders upon the steady increase in the consumption of gas during the twelve months ending June. The production, however, of a larger supply, it is pointed out, necessitates continued extensions and improvements of the works. In the course of the year, the erection of a new meter-house, with station meter, exhauster and engines, and the extension of mains have involved an addition of £1458 to the capital account. In the coming year, it will be necessary to provide extra retorts; and at no distant date the erection of a new gasholder will have to be undertaken. These extensions mean a considerable increase in the capital, which the Directors say they would gladly avoid, but the continual expansion of the town on every side leaves them no alternative. The profit on the working of the year, after payment of mortgage interest, income-tax, &c., amounts to £1690, to which has to be added the balance from last year of £639; making an available sum of £2329. Out of this an interim dividend of 4 per cent. was paid in March last, amounting to £720. The Directors now recommend a further dividend of 5 per cent.; making, with the interim dividend, 9 per cent. for the year, free of income-tax. This will absorb £938, and will leave a balance to be carried forward of £670. The cost of coal and purifying materials and the rate of wages, the Directors remark, have risen considerably during the past year. They hope, however, that the increase in the consumption of gas will more than counterbalance this higher cost, and anticipating this increase they have decided to reduce the price of gas 3d. per 1000 cubic feet, to take effect from Oct. 1.

Presiding at the half-yearly meeting of the Normanton Gas Company last Saturday week, the Chairman (Mr. W. Statter) stated that the affairs of the Company were in a very satisfactory position. The statistics he gave showed that the total expenditure during the six months amounted to £1203—£90 more than in the June half of last year. The total income came to £2110; being an increase of £151. This enabled the Directors to pay a dividend of 8 per cent., and left a small balance to be carried forward.

The 70th half-yearly meeting of the Ossett Gas Company was held on the 14th inst.—Mr. W. Statter presiding. The Chairman, in moving the adoption of the Directors' report, observed that owing to the considerable advance in the price of coal, the Directors had raised the price of gas from 2s. 6d. to 2s. 9d. per 1000 cubic feet. The share capital amounted to £37,800, or £7800 more than it was a year ago; and the increase during the half year had been £2950, of which £2530 was for extensions at the works, and £299 for additional mains. There remained £1198 uncalled up on the "B" shares. The total income for the half year showed an increase of £235 over the corresponding period of last year; and the expenditure, £414. The profit amounted to £1603, of which £1502 could be appropriated to dividend, and £101 carried forward. Mr. G. Harrop seconded the motion, and it was adopted. The Chairman next proposed the declaration of the usual dividends, of 10 and 7 per cent. respectively, and this was adopted. A vote of thanks was passed to the Directors; and a similar compliment was accorded to the Secretary and Manager.

The half-yearly general meeting of the Poole Gas Company was held on Monday, the 11th inst., when the Directors reported a falling off in the profits to the extent of £137, owing to the higher cost of coal in the half year ending the 30th of June last. They nevertheless recommended the payment of dividends at the rates of 5 per cent. per annum on the "A," and of 4 per cent. per annum on the "B" stock and "C" shares. This with the interest on the debenture bonds would absorb about £711 out of the £747 available for distribution. The Chairman (Mr. H. Farmer), in moving the adoption of the report, stated that there had been a slight increase in the consumption of gas, both for public lights and private consumption, in the past half year; but the quantity was much below that of other towns of similar size and population. The Directors had advanced the price of coke 2s. per ton; and before the commencement of another quarter, would have seriously to consider the question of raising the price of gas—the extra cost of production approaching 6d. per 1000 cubic feet. The report was adopted and the dividends declared.

Mr. S. H. Kimbell, the Secretary of the Wellingborough Gas Company, has favoured us with the report of the Directors and some statistics relating to the working during the half year ending June. The report announces that the application for parliamentary powers for the extension of the Company's district has been successfully made this session, and the Act confirming the same has been passed. The laying of the main to Earls Barton has been rapidly pushed forward, and at the present time the branch mains are being laid in the village. The supply of gas there will very soon be commenced. A set of new condensers has been erected this summer, in place of the old ones which had become inadequate; and some of the other apparatus in connection therewith has been re-arranged. To meet the expenditure on the extension of the Company's district, the Directors propose raising the balance of the loan capital authorized by the Company's Act. Debenture bonds of £100 each will be issued; bearing interest at the rate of 4 per cent. per annum. The revenue account shows receipts amounting to £3878, of which £2416 was expended; leaving a balance of £1462. The disposable amount at the credit of profit and loss account is £2026, from which the Directors recommend the payment of a dividend of 5½ per cent., free of income-tax. The quantity of coal carbonized in the six months was 1967 tons, from which 20,195,700 cubic feet of gas were produced, equal to 10,267 feet per ton. The gas accounted for was 19,153,000 feet, or 9738 feet per ton. The gas sold was 18,939,100 feet, or 9828 feet per ton. The percentage of unaccounted-for gas was 5·16.

The report presented by the Directors at the recent meeting of the Weymouth Consumers' Gas Company indicated that the business was making steady progress. The profit for the past half year amounted to £2124, which exceeded that of the corresponding six months by £91. The residual products produced a larger return, which, with an increase in the gas-rental, represented a substantial set-off against the extra cost of coal. The total receipts came to £5400; and the expenditure to £3276. The Directors announced that they had succeeded in extending their coal contract for a year at a price which, although much higher than they had been accustomed to, they considered a reasonable one when compared with the current market prices. In moving the adoption of the report, the Chairman (Mr. A. Thomas) remarked that, taking all the adverse circumstances into account, it was very gratifying to be able to present such a satisfactory balance-sheet as the present one. He was always under the impression that a great future lay before the Company, and thought it was now about to be realized. Mr. Eliot seconded the motion, which was carried. Dividends were declared at the rate of 10 per cent. per annum on the ordinary "A" stock, and 7 per cent. on the ordinary shares, subject to deduction for income-tax. Before the close of the meeting, the services of the Chairman and Directors, the Manager and Secretary (Mr. James Lowe), and the other officers were suitably recognized.

Water Companies.

At an extraordinary meeting of the Bristol Water Company held last Saturday, it was decided to raise additional capital by creating new ordinary stock amounting to £240,000, and to borrow £60,000 at 4 per cent. The Chairman (Mr. E. Bush) stated that new capital was needed for completing existing works, and for carrying out new works they were undertaking in Somerset. The new storeage reservoir at Barrow would be ready for use by next winter.

At the recent half-yearly meeting of the Sevenoaks Water Company, the Directors reported that the balance at the credit of the profit and loss account was £1044; and on their recommendation, a dividend was declared at the rate of 8 per cent. per annum on the consolidated stock, and £5 12s. per cent. on the share capital, free of income-tax. These payments will absorb £951.

A dividend at the rate of seven per cent. has been declared on the working of the Southport Water Company for the past half year. Debenture stock amounting to £71,240 is to be created, bearing interest at the rate of 5 per cent. The object of the movement is to extinguish the existing mortgage debt of the Company.

The report submitted by the Deputy-Chairman of the Warrington Water-Works Company (Sir Gilbert Greenall) at the half-yearly meeting of the shareholders last Wednesday, stated that the revenue account showed a balance, including £1045 brought forward from the previous six months, of £4922. The dividend on the £40,000 preference stock amounted to £900, leaving a balance of £4022, out of which the Directors recommended that a dividend be paid at the rate of 7 per cent. per annum on the £30,000 ordinary 7 per cent. shares, 7½ per cent. on the £15,000 ordinary 7½ per cent. shares, and 8 per cent. on the £30,000 ordinary 10 per cent. shares. The balance to be carried forward amounted to £1209, as against £1043 at the end of the corresponding half of 1889, for which half year the dividend was at the rate of 6½ per cent. per annum upon the three classes of shares. The reserve fund amounted to £3743. The Deputy-Chairman, in moving the adoption of the report, congratulated the shareholders on the prosperous state of the Company's affairs, and alluded to the fact that the undertaking would pass into the hands of the Corporation on the 1st of July next. Mr. J. Charlton Parr seconded the motion, which was unanimously agreed to.

Alfreton Water Supply.—Some time ago the water supply of the Alfreton district was found to be quite inadequate to the demand; and it was resolved to enlarge the reservoir at Butterley. The reservoir, when finished, is to be 80 yards square and 10 yards deep. Nearly 100 men are on the work, which will be nearly completed by Christmas.

THE WHITEHAVEN GAS COMPANY AND THE TOWN TRUSTEES.

The Company's Application to Parliament for Powers.

Early in the present session of Parliament, a Bill promoted by the Whitehaven Gas Company came before a Select Committee of the House of Commons. The Company desired powers of incorporation, to be placed under parliamentary restrictions, and sanction to raise further capital. The Trustees of Whitehaven vigorously opposed the Bill when before the Committee, who, however, after making two alterations in it—viz., increased the illuminating power of the gas from 14 to 15 candles, and reduced the maximum price to be charged from 5s. to 4s. 6d.—declared the preamble proved. The measure subsequently came before a Committee of the House of Lords, presided over by Lord Belper, when the promoters were represented by Mr. Balfour Browne, Q.C., Mr. Worsley Taylor, and Mr. Erskine Pollock; while the petition of the Whitehaven Trustees in opposition was supported by Mr. Pope, Q.C., and Mr. Pembroke Stephens, Q.C. The evidence adduced was very similar to that which was brought before the Commons Committee.

The case for the promoters was opened by Mr. Balfour Browne, who stated that the Company as it now existed was registered in 1884; and he then proceeded to explain the objects of the Bill. He laid great stress on the wish of the Company to be empowered to break up the streets. Hitherto they had been opening the streets with the permission of the Local Authority; but they themselves had no right to sanction the breaking up of the thoroughfares of the town. All they could do was to promise that they would not indict the Company for a nuisance. He next traced the history of the concern from the inception of the old Company in 1830. In 1853, a new Company was started, under the title of the Gaslight Consumers' Company. Their works were erected on what they called the Meadow site; and the works of the old Company were at Bransty. In 1873 the old Company bought out the new one for £20,000, because competition in the supply of gas was found to be a disadvantage in many ways. When the United Company was registered in 1884, it had a nominal capital of £60,000. Counsel went in great detail into the finances of the old and new Companies; and proceeded to state that this was the first time the United Company had come to Parliament for powers. They now asked that their capital might be increased from £60,000 to £80,000, to be entitled to 8½ per cent. dividend. It was proposed to make this new capital subject to the auction clauses. The Company had a balance of capital of £22,500, only part of which had been issued; and the opponents of the Bill asked that this should also be subjected to the auction clauses. This, he urged, would be very unfair; seeing that a portion of the shares had been paid. There was a paragraph in the petition referring to the transfer of the Company's works to the Trustees. It was as follows: "The Bill as introduced, and as it passed the Committee of the House of Commons, contained a clause conferring power on the Company to transfer their undertaking to the Local Authority upon agreed terms; but it did not confer on the Local Authority any power to make the transfer. That clause was, on the consideration of the Bill as amended in Committee, struck out by the promoters." Learned Counsel denied that this was so; the clause having being struck out by the Chairman of Committees of the House of Lords, because, he said, the Bill could not confer powers on another authority, and they would have to apply for an Act themselves The Trustees were asking for compulsory powers to purchase the works; but the Company were not now willing to sell them.

Evidence was then called on behalf of the promoters; the first witness being Mr. Shadrach Studholme, who has occupied the position of Managing-Director and Secretary of the Company for the past 23 years, and who is a shareholder to a considerable extent. He deposed that the old Whitehaven Company manufactured gas on the Bransty site, part of which was leasehold land, and part was merely held from year to year from Lord Lonsdale. A piece of the land (1006 yards) they agreed, when in the House of Commons, to give up to his Lordship. A portion of this piece of land was valuable for the Company's purposes; but they parted with it in order to obtain a lease of the land that was held on yearly tenancy. They had now long leases of both the Bransty and Meadow sites. They were exceedingly cramped for room on the existing site; and it would be an advantage if they could remove the works in course of time to the Thicket site. The old Company was started in 1830; and between 1847 and 1869, they spent from £11,000 to £12,000 out of revenue. At the time of the reconstruction of the concern, the works and goodwill of the new Company were purchased for £20,000. At that time their own works were valued at between £29,000 and £30,000. Since 1884 they had paid dividends of 6, 6½, and 7½ per cent.; the average being about 6¾ per cent. As to the supply of gas, there had been no complaints, except during a strike of the men about a year ago. In 1884, £22,500 of "B" shares were issued; and £2 10s. of these was called up. This was done long before the Company anticipated coming to Parliament; so that everybody who had subscribed £2 10s. could be called upon for £7 10s. more, and to share the pecuniary responsibilities of the Company. The illuminating power of the gas was 15 candles; having been raised 1 candle in the other House. As to the price of gas, they proposed to have a maximum of 4s. 6d. per 1000 cubic feet. During witness's time the charge had been 4s. 7d. Mr. Studholme was cross-examined at some length by Mr. Pembroke Stephens, who read a resolution passed at a meeting of shareholders on April 26, 1830, in which they assured the Whitehaven Trustees that the Company would not apply for any Act of Parliament which might "interfere with the powers and authorities of the Trustees so long as the Company are permitted, under the superintendence of the proper officer of the Trustees, to take up the pavements for all necessary purposes connected with the gas-works." This resolution, witness said, was passed on the condition that the Company would light the town and harbour for seven years. This they did; and that ended, in his opinion, the permission. The Trustees owned the public lamps; and they bought the gas required from the Company. The latter did not give any official notification to the Trustees of their intention of coming to Parliament for further powers; but he himself had informed their Surveyor at the Town Hall. Their object in coming to Parliament was to get powers to open the streets to carry on their business, to protect the money they had at stake, and to prevent the Trustees from going to any street and opening the mains without the knowledge of the Company. With regard to the works for which the Company gave £20,000, they were valued by the late Mr. G. W. Stevenson, who was a very competent Gas Engineer. In his experience, the lowest price they had ever charged the general consumers for gas was 3s. 4d. per 1000 cubic feet; but the Trustees were supplied, under contract, at 2s. 10d. per 1000 feet. Many years ago, when the Companies were at war with each other, the price was as low as 2s. Before the United Company came into existence, in two or three years a dividend of 20 per cent. was paid; but there were many years when they obtained no return. The average dividend of 6¾ per cent. applied to years since 1880. They were now asking for a maximum dividend of 8½ per cent. on the whole capital. The promoters wanted the Bill to pass in order to give them a legal status in the town; and because they were short of money. Regarding the purchase of the works by the Trustees, witness admitted that when the Bill was before the Commons Committee he said they were willing to sell, if a reasonable offer for private purchase was made; but they had since been very much harassed, and were not now at all disposed to sell the works. In re-examination, witness said he did not see any reason why the Bill should be rejected merely because the Trustees suggested that they might introduce a Bill to give them power to buy up the works. Additional capital was required for the purposes of the undertaking; but there was no temptation for them to raise a greater sum than was absolutely necessary. Mr. R. A. Robinson, who is the principal agent for the Whitehaven estates of the Right Hon. James Lowther, and the Trustee of the Earl of Lonsdale, was next examined. He strongly supported the Bill; saying that he thought the powers sought were very proper, both for the protection of the Company and the public. In compliance with a request of the Chairman, Mr. Balfour Browne here handed in a statement showing that in the ten years from 1874 to 1883, the average dividend was 16·82 per cent.; from 1864 to 1873, 3·6 per cent.; and from 1854 to 1863, 1·87 per cent.—the average for the whole period from 1854 being 7·43 per cent. Taking the 20 years from 1864 to 1883, the average worked out at 10·2 per cent.

Evidence was next given by Mr. Thomas Newbigging. He deposed that he was well acquainted with the Company's works; and the plant was all in good order. There was no doubt, however, that the works might be better conducted if the Company had more room. The concern had been well managed in the interests of the consumers, but the increase in the consumption had not been very rapid of recent years. The increase last year was only 2 per cent. He certainly thought that the Company were wise in applying to Parliament for statutory powers. With regard to capital, he considered the promoters were exceedingly moderate in only asking for an additional £20,000. It was open to anyone to purchase the stock when it was offered for sale; but even in the hands of the present shareholders, it would only yield 5 per cent. The £100 of stock would sell for £140. He anticipated that, within twelve or fifteen years, both the uncalled capital and the £20,000 would be needed by the Company. His estimate of the cost of the works upon the new site was £17,500; but there would be available from the existing works apparatus to the value of £4000—leaving £13,500 for the new works. But in addition to this, a new gasholder was wanted; and this would absorb £5000. This was required immediately; but they had not the ground to erect it upon. The mains also would have to be re-arranged; and this would cost £1500. An extension of the mains to the farthest point of the new limits of supply would cost £1500; engineering expenses would absorb £500; and there would be the cost of the Special Act, which witness put down at £2000. He put the working capital at £7000. Possible extensions to meet the expected growth in consumption during the next twelve or fifteen years would require £16,500. These figures made £47,500, which was about the capital the Company would have power to raise under the Bill, and which, added to the present capital, would make £100,000. He estimated that if the works were removed to the new site, there would be a saving of 4d. per 1000 cubic feet, by the work of manufacture being carried on more cheaply. Fourpence per 1000 feet on the consumption of 50 million feet, amounted to £820; and this would pay 5 per cent. upon the £17,500 proposed to be expended upon the works. It was true the Company could, if pressed, put a new holder on the Meadow site; but the space available was not so large as he should like. The present holders could not very well be telescoped. Witness computed that the present works would produce about 25 per cent. more gas than was consumed last year; but it would not be manufactured so economically, as it would be on the new site. Besides, it was not well to run to the extremity of their margin. He was consulted as to the proposal in the Bill to take power to supply electrical machines, which it was hoped would be driven by gas. In his estimate, however, he had not taken any capital for this purpose into consideration. As to the price of gas, the circumstances would be exceptional that required a charge of 4s. 6d. per 1000 cubic feet; but still they ought to have a margin. At the present time, the charge for gas was 3s. 4d. During the past nine months the price of coal in Whitehaven had risen by 4s. 6d. a ton, which meant 6¾d. per 1000 cubic feet of gas. He had looked up a number of gas companies in England and Wales; and he found that the number whose maximum price was prescribed was 267. Of these, 233, or more than 87 per cent. of the whole, had a maximum price of 4s. 6d. and upwards. On the question of the purchase of the works by the Whitehaven Trustees, he said that in his long experience he did not know of a single case where a local authority had by compulsion purchased the works of a gas company. On this point, in cross-examination, witness said that it was not the tendency for gas-works now to be transferred into the hands of local authorities. It was so ten years ago; but since electricity had began to be applied somewhat extensively, it was just the other way. Asked whether it did not seem

that to have spent £52,500 on the works, upon which the promoters were asking 8½ per cent., there must have been rather a wasteful expenditure, witness replied that necessarily the capital of an old company was much more than the capital of a new company. For gas-works, he preferred a freehold site; but at the same time he did not object to a site with a 99 years' lease. Questioned as to how any loss resulting from the electrical business was to be met, witness said he did not see how it could end in a loss. His idea of the electrical clause contained in the Bill was that it was really to extend the consumption of gas by hiring out engines.

The next witness called was Mr. Corbet Woodall. He stated that he regarded the provisions of the Bill as reasonable and proper. The profits of the Company last year admitted of a dividend of 7½ per cent.; the sum necessary to do this being £2812. The proposed maximum dividend of 8½ per cent. would require on the present capital £375 more. He did not think the question of the removal of the works was the principal object of the Bill. The incorporation of the Company was a very important matter; and too much stress could not be put upon it. He thought the Company ought to have applied to Parliament long ago for the securities they now desired. As to the works, they were undoubtedly small in area; and one result of this was that the manufacture was carried on extravagantly in some respects. The Company had to dispose, for instance, of the coke as it was produced, and they had to receive their coal almost from day to day straight into the works; and such things as these added to the cost of producing gas. Having regard to these circumstances he considered the expenses of making gas was remarkably low. He believed the two holders on the Meadow site could be telescoped; and that, if pressed, they could put another holder there. On other points, witness corroborated the evidence of Mr. Newbigging. In cross-examination, Mr. Woodall said he greatly preferred freehold to leasehold land for gas-works; but the arrangement the promoters had made in regard to the new site, he did not think was open to objection. With reference to the 25 per cent. margin which the Company had in their producing capacity at the works, he thought that no gas company ought to fall below a margin of 10 or 15 per cent. The Company had spent considerable sums out of profits on the extension of the works; and they then paid low dividends. During the period in which they ceased spending profits in this manner, they paid high dividends. If the other portion of the works was equal to the retort-houses, they could afford to stay on the present site for some time to come. Their holder capacity was only equal to 51 per cent. of the largest sale in 24 hours.

Mr. Pembroke Stephens, in the absence of Mr. Pope, then addressed their Lordships on the preamble in opposition to the Bill. He first pointed out that the Company took their position in the district by a distinct assurance conveyed to the Trustees that they would not apply for any Act of Parliament which might interfere with their powers and authorities so long as they were permitted, under the superintendence of the proper officer of the Trustees, to take up the pavement for all necessary purposes connected with the gas-works. It was now suggested that this assurance was satisfied at the end of seven years; but he could find no basis for that in the language of the resolution, or in any evidence that had been given. It was quite clear, however, that if the assurance was at an end at the expiration of the seven years, the Company would have come for a Bill ere this. In the face of the agreement, the least the Company could have done before coming to Parliament was to have consulted with the people with whom they made the agreement. By the evidence adduced, they had done no such thing. However, assuming the Company to be free, was there any necessity for the Bill at all? The Whitehaven Trustees had never interfered with the promoters' business; and as to the money powers they sought, he maintained that there was no need for them, as there was no new district to develop. Besides, the Company were in a most comfortable position in regard to capital; having still £22,500 not called up. The promoters said they desired statutory powers; but the town had its rights just the same as the Company. The essence of the case was that the whole of the existing status was to be changed, without the consent of the Trustees; and if the Bill passed, the Company would become *quasi*-monopolists. With respect to the suggested transfer of the undertaking, he said evidence had been given that there was no instance in which a concern of this kind had been compulsorily placed in the hands of the local authority. It was not the passing of compulsory Bills, but it was the steady pressure which Parliament had put upon the bodies concerned that had brought about, time after time, the transfer of gas-works. It would be a great advantage to the town to have possession of the works. The Company would, of course, be paid the full value for its undertaking; and the town could borrow the money required for this purpose at 4 per cent. He was authorized to say, in the most distinct manner, that the Trustees were willing to acquire the undertaking on arbitration terms; and if it could not be accomplished this year, they would pledge themselves to bring in a Bill with this object in view next year. Under these circumstances, the learned Counsel said he could not see any possible justification for pressing the proposals in the Bill before their Lordships.

In his reply, Mr. Erskine Pollock complained of the way in which the promoters had been treated by the Trustees throughout the proceedings on the Bill. The latter now said they were willing to purchase the Company's works on fair and reasonable terms. But it was not until after the promoters had gone to the expense of getting up their case for the Bill, and after it had practically passed through one House, that the Trustees were advised that, if they maintained their opposition they should be prepared to purchase the rights of the Company. They accepted this advice. But although they had passed a resolution on the matter, it could not be binding, as they had not consulted the ratepayers. Why, therefore, should the promoters be thrown out of Parliament at the last moment? He contended that it would be altogether unfair to them. The supply of gas had always been good; and the powers sought for ought, Counsel contended, to be granted.

The room at this stage of the proceedings was ordered to be cleared; and on the parties being called in, the Chairman announced that the Committee had considered the question of the preamble, and were unanimously of opinion that it had not been proved.

THE SUPPLY OF GAS FOR BALLOONING.

A balloon ascent, whether the aërial vessel is captive or free, is a not uncommon accompaniment, in these days, of a show or a big exhibition of any kind. On such occasions, the services of the local gas suppliers, or rather of their manager, are called into requisition to furnish the necessary fluid for the inflation of the balloon; and, as a rule, this constitutes a good "line" in the weekly account of sales. Any gratification that may be attached to the receipt of a large order of this kind is, it seems, liable to be marred by the reflection that, if all should not go right, the manager will find himself or his gas saddled with the responsibility for the failure. On the last Bank Holiday, ballooning appears to have formed a conspicuous feature in the attractions provided in different parts of the country. Statistics are wanting as to the exact number of ascents actually made; but we know for certain that there were no less than six failures, the reason of which it is not our business to investigate. Among other places where ballooning was to form a prominent line in the holiday programme was High Wycombe—renowned for its association with the chair-making industry—where the local Horticultural Society were holding a show. Arrangements were entered into with a notable "Professor" and a lady to make a series of parachute descents in the Wycombe Abbey Park. At this spot provision was made to afford the necessary supply of gas; but, unfortunately, it was found to be impossible to inflate the balloon. As the failure of the inflation was thought to be due to a want of pressure of gas, it was decided, in order, if possible, to prevent disappointment of the public, to take the balloon to the works, and there make another attempt to send it up. But all efforts to do so were unavailing; and the public were compelled to forego the anticipated pleasure of seeing the Professor and his lady go through their exciting performance. No doubt blame was pretty freely bestowed on the Manager of the gas-works (Mr. C. King) for this *fiasco;* but he declined to accept the responsibility. Under the circumstances, the Committee of the Society, at the suggestion of the Professor, requested Mr. W. H. Le Fevre, C.E., President of the Balloon Society, to examine the balloon and inspect the gas-works. This he did, and reported on the matter to the Committee. The result of his investigation was to ascertain that 60,000 cubic feet of gas passed through the pipes to the balloon in about four hours. As this was about three times the quantity stipulated for, Mr. Le Fevre could only account for the non-inflation of the balloon by the great escape of gas which took place through the material of which it was made, owing to this having been insufficiently varnished. The balloon, in point of fact, was not gas-tight; and almost as fast as the gas was sent in, it leaked out through the pores of the silk. The porosity of the fabric was verified by two members of the Committee of the Society, who stated that, when they blew through it from the inside, a current of air was plainly perceptible by placing the hand to the exterior. It was complained by the balloonist that the gas was not buoyant enough; but it was pointed out to him that it was the same as was used all over the town. There was no getting away from the fact that it was the balloon, and not the gas, that was defective. This was borne out a few days later, when another aëronaut, with a different balloon, made a successful ascent from the same place and under precisely similar conditions to those previously obtaining. Something like 20,000 cubic feet of gas were sent into the balloon in 59 minutes; whereas in the other case about four hours were spent in the unprofitable occupation of passing gas into what was practically a sieve. We understand that in one of the northern towns the gas manager had a rather worse experience than that of his colleague in the west. There they had two failures on different occasions; and the third time only managed to get the balloon up by putting on a heavy pressure from a 6-inch main. These events point to another source of trouble and anxiety to gas managers; for there is no telling that they may not some day be charged with causing a balloon accident because their gas cannot be made to remain in a porous vessel.

The Barnsley Gas Strike.—Last Wednesday, ten men, nearly all of whom were gas stokers on strike, were charged at the Barnsley Court House with obstructing the causeway at Old Mill in front of the gas-works, where several new hands are at work. It was promised on their behalf that the offence should not be repeated; and they were only ordered to pay reduced costs, amounting to 6s. each.

Water Gas as a Stage Illuminant.—The following paragraph appeared in the *Yorkshire Post* last Tuesday: "On Saturday evening the first installation of water gas in any theatre in Great Britain was made at the Spa, Harrogate. The arrangement of the water-gas lights on the stage were perfectly simple, and proved a gratifying success as an illuminant; a single candelabra of four burners lighting the whole of the stage with great brilliancy and steadiness during the orchestral concert by the Spa Band. The arrangements were carried out by the British Water-Gas Syndicate."

The Salford Gas Frauds.—Within the past few days (says last Friday's *Manchester Guardian*) the convict Hunter has been removed from Strangeways Gaol to the convict prison at Chatham. Ordinarily, prisoners sentenced to penal servitude are only detained about twelve months in the gaol to which they are first committed; but Hunter has now been an inmate of the Strangeways prison some two years. It is understood that the ordinary rule was departed from in Hunter's case in order that his solicitors might have easy access to him while the civil proceedings between himself and the Salford Corporation were pending. All efforts to secure his release have been unsuccessful; and he will probably remain at Chatham for about another year and nine months. He has already served about two years of the five to which he was sentenced; and the practice is to liberate convicts on ticket-of-leave before the expiration of the full term. All depends, of course, on the behaviour of the convict; but, as a rule, men who conduct themselves well are only detained for about three-quarters of the time for which they were committed. It is stated that Hunter has not been by any means in such bad health as has been reported; and when he left Strangeways he was in very good spirits.

METROPOLIS WATER SUPPLY.

The Quality of the Water during the Month of July.

Messrs. Crookes, Odling, and Tidy, in the course of their report to the Official Water Examiner (General A. de Courcy Scott), on the quality of the daily samples of water supplied in London during the past month, say: "During the first three weeks of the month of July the condition of the water supply to the Metropolis continued to be, as it had been for months previously, entirely satisfactory; but during the last ten days of the month there was manifested an appreciable deterioration, especially in respect to the degree of colour-tint upon examination in bulk, consequent on the exceptional heavy rainfall of the 17th and 18th. This deterioration was noticeable to some extent in the supply of all the seven Companies, but more especially in the case of four out of the five Companies taking their supply from the Thames. That the deterioration was associated with but an insignificant increase in the proportion of organic matter present in the water—and that inferred on good grounds to be mainly of a vegetable nature—is shown by a comparison of the determinations of organic carbon present in the water supply of the earlier and later portions of the month, with the determinations of the degree of colour-tint manifested during the same periods respectively. Thus, in the case of the five Companies deriving their supply from the Thames, while the mean ratio of brown to blue tint of the water during the first three weeks of the month was as 13:20, during the last ten days of the month it was as 22:20. But as regards organic carbon, the mean proportion for the first three weeks of the month being 0·143 part in 100,000 parts of the water, with a maximum of 0·161 part in any single sample examined, the mean proportion for the last week of the month was but 0·165 part in 100,000 parts of the water, with a maximum of 0·185 part in any single sample examined. Altogether, the mean proportion of organic carbon for the entire month of July was but 0·152 part, as against a mean of 0·150 part for the month of June. As regards the heavy rainfall of the month, and the consequent unfavourable condition of the rivers, it is to be noticed that on 28 out of the 31 days of the month there was an appreciable rainfall in the Thames and Lea Valleys, and on one or two of the early days of the month a decidedly heavy rainfall, followed up by the remarkable rainfall of the 17th, and very considerable rainfall of the following day. Mr. G. J. Symons, F.R.S., has informed us that the mean rainfall for the month in the Thames and Lea watersheds was 3·73 inches, of which 1·92, or nearly 2 inches, fell on the 17th and 18th. Mr. Symons further writes us: 'The rain of the 17th was a very exceptional, if not unprecedented one, not on account of the absolute totals (though one gauge, Lord Ebury's, at Moor Park, Rickmansworth, collected 4·19 inches, and another at Hillingdon, Uxbridge, collected 4 inches and then ran over) as because of the very large area with upwards of 2 inches, and the considerable area with more than 3.' Speaking of these high returns, he has elsewhere observed: 'It is perhaps noteworthy that they are all from stations either actually on the banks of the Thames, or within three miles of it.' In view of the really unprecedented amount of the rainfall—in regard to the wide area of heavy fall, more considerable even than that of July 26, 1867—it is only to be wondered at that the water supply to the Metropolis should have been so inconsiderably affected."

SHREWSBURY CORPORATION WATER SUPPLY.

Proposed Improvement in the Works.

A long report was presented by the Water Committee at the last quarterly meeting of the Shrewsbury Town Council on various questions connected with the water supply. It appeared therefrom that in May last they presented a report which was referred back to them for information on the following matters: (1) The extra cost per annum of pumping a continuous supply; (2) The amount which it was proposed to be spent on the old works; (3) The amount required to buy the land proposed; and (4) generally the amount of money required to carry out their recommendations. The Committee now stated that the extra cost of pumping would be about £360 per annum; but they were advised by the Water Engineer that with the new machinery, boiler, and alterations to the stack and engine-house, recommended in his report, and with 50 per cent. of waste stopped, the consumption of coal would be practically reduced 50 per cent. As to the amount of money proposed to be spent on the old water-works, the Committee recommended that the works mentioned in the report of the Engineer be carried out without delay—viz., high pressure triple expansion engine and pumps, £1800; additions and alterations to engine-house, £700; one high-pressure boiler, including fixing, £400; alterations to present chimney stack, £200; total cost of works, £3100. That an electrical mechanical indicator be fixed connecting the engine-house with the tank, at a cost of £50. That the tank be scraped, and painted at an estimated cost of £40. With regard to the amount required to buy the land proposed, the Committee were of opinion that any favourable opportunity of acquiring the land adjoining the water-works which might present itself, should command the serious attention of the Council; but they did not at present make any specific application for funds for that purpose. The Committee also recommended that two of Deacon's waste-water detector meters be at once purchased at a cost of about £75 each. The total amount which the Committee stated they would require was £3765. Mr. J. Barker, in moving the adoption of the report observed that the new Water Committee thought that a large scheme of water supply would be inopportune at the present time; and therefore they proposed the improvements embodied in the present report. Mr. Morris seconded the motion; but after an exhaustive discussion an amendment, moved by Alderman Lloyd, was carried approving of the continuous supply being continued, and of the expenditure of £50 for an electrical mechanical indicator, £40 for scraping and painting inside the tank, and £150 for two Deacon's waste-detecting meters; but adjourning the discussion of the remainder of the report till the next monthly meeting.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday*.

The Penicuik Gas Company, which has been in existence for eleven years, is a well-managed concern. It supplies gas of an illuminating power of from 27 to 29 candles, at a cost of 5s. 5d. per 1000 cubic feet; the contiguity of the place to the cannel-fields of Mid-Lothian enabling them to keep up the high quality. No addition has been made to capital since 1878, the first year of the Company's existence, when the account stood at £8974; and since then £2569 has been written off the account out of earnings. In order to wipe off arrears upon customers' accounts, a sum of £114 is this year written off for depreciation; and the reserve fund is reduced from £100 to £50, which figure the Directors consider is sufficient for the needs of the Company. There was a free profit last year of £667 14s. 11d., out of which a dividend at the rate of 10 per cent. is paid.

Litigation has arisen between the Commissioners of Police of Leven, in Fifeshire, and Mr. John Gilmour, of Lundin and Montrave, a landed proprietor in the neighbourhood, over the water supply of the burgh. The Commissioners last year obtained a Provisional Order empowering them to introduce a water supply; and they propose to take the water from the Hatton Burn, which flows through Mr. Gilmour's lands, and to construct a reservoir upon his land. For these privileges Mr. Gilmour in December last instituted a claim of £16,000, which the Commissioners considered too high; and they offered £1800, undertaking, at the same time, to secure Mr. Gilmour's present water supply. These terms were rejected by Mr. Gilmour, who nominated arbiters to determine the value of the subjects which the Commissioners proposed to take. The purpose of the litigation is to have the proposed arbitration proceedings interdicted, principally upon the grounds that the claim does not include a claim for the road or way-leave through the grounds; and that Mr. Buchan, one of the arbiters nominated, is disqualified in respect that he has acted as Mr. Gilmour's adviser in the matter. In his answer, Mr. Gilmour expresses his willingness to amend his claim. He also denies that Mr. Buchan is disqualified; and says that since his nomination as arbiter he has not been consulted in any way. It is explained that a considerable part of Mr. Gilmour's estate extends along the coast at Lundin Links from Lundin Mills towards Leven. This piece of ground is admirably adapted for feuing; and since acquiring the estate, Mr. Gilmour has had it in view to obtain a water supply for his feuing ground from the Hatton or Montrave Burns, which unite at a point within the area of the proposed reservoir. Complainers' operations, it is alleged, would seriously affect the feuing of this land. Lord Trayner, before whom the action was this week debated, said the question raised seemed a very important one, because it lay at the basis of the arbitration. The question was what were the subjects on which the arbiter was to put a value. If the complainers were entitled to the road, they were bound to pay for it. The Act said so, and the value was to be settled by arbitration. That was a question of law, which had to be settled by the Court upon the construction of the Provisional Order before the arbitration proceeded further. He would therefore pass the note, and continue the interim interdict. The action will come up again in October.

Edinburgh is a hilly city, so much so that it is with difficulty that pressures, both of gas and water, can be maintained with anything like equality. The water pressures are particularly troublesome, that which is sufficient to supply the top flats of the high houses on the Castle Hill being positively injurious to fittings in the lower regions. Complaints have been frequent as to over-pressure on the north side of the town, and some time ago a pressure-relieving tank was tried in the Heriot Row district. It has worked so well that the Water Trustees are at present constructing a large similar double tank in Queen Street Gardens, which will affect the service over the greater portion of the north side of the town.

The Aberdeen Town Council on Monday dealt with an application from the Trustees of the Trades' Widows' Fund for a supply of water for property which the Trustees have acquired upon Deeside—about eight miles from Aberdeen. The great peculiarity of the request was that the supply was wanted direct from the aqueduct. It required considerable firmness on the part of the Council to refuse the application, because the applicants were one of the city incorporations, and possessed considerable influence in the city. It was felt, however, that it would be inadvisable to tap the aqueduct for a supply to a small place, both on account of the risk of leakage and damage to the aqueduct itself, and of the fact that if this application were granted, others would spring up and could not be refused; and in the end the Aberdeen water-works would exist, not for the supply of the citizens of Aberdeen, but of the whole district through which the aqueduct runs. It was also the opinion of the majority of the Council that the supply which was asked was for a property which, though they have power to supply outsiders, is beyond the sphere which they could reasonably be called upon to furnish with water, and the Council rejected the application.

An action was recently decided in the First Division of the Court of Session which will illustrate, to bodies supplying water, the value of giving the supply by meter, and to consumers of water, the inadvisability of the same method of supply. The action was brought in the Sheriff Court at Edinburgh, where the Musselburgh and Dalkeith Water Trustees sued William M'Gregor, contractor, of Musselburgh, for £41 8s., the amount of an account for 825,000 gallons of water supplied per meter from November 1, 1888, to May 1, 1889. Alternative defences were stated for Mr. M'Gregor—either that the meter had been incorrectly read, or that it was inaccurate. The meter was twice tested and found to be correct; and Sheriff-Substitute Hamilton after proof repelled the defences and gave decree as craved, with expenses. Sheriff Crichton on appeal adhered to this judgment, and the defender brought the decision under review of the First Division, where their Lordships unanimously affirmed the judgment of the Sheriff, with expenses. The Judges were of opinion that the evidence showed that the meter was correct, and that there was no mistake in the reading. Lord M'Laren said that the reading of the meter in

November, 1888, was 105,000, while in May, 1889, it was 930,000 gallons. There was no reason, in his opinion, for this startling increase, except on the supposition of gross waste by the tenant in possession, who had no interest in checking the waste.

From our Glasgow Correspondent.

GLASGOW, *Saturday*.

The Directors of the Partick, Hillhead, and Maryhill Gas Company have just issued their report and financial statement for the year 1889-90, which ended on the 30th of June. As the annual meeting of the shareholders of the Company is to be held in Glasgow next Friday, the summary or analysis of it may be deferred for the present, so that along with it there may be given an account of the proceedings at that meeting. One or two facts, however, may be mentioned. The net profit for the year is set down at £10,831 4s. 2d.; and of this amount a sum of £1500 has been carried to the depreciation fund. Out of the balance it is proposed to pay dividends of 5¾ per cent. on the preference shares, and 6 per cent. on the ordinary shares; while in reduction of the parliamentary expenses incurred during the past session it is proposed to vote a sum of £1000. There will be left a balance of £681 4s. 3d. to carry forward to next year's accounts. So far as they have been looked into, the result of the Company's operations during the past year are regarded as having been very fair. Of course, as is now well known, the Company did not fare very well in Parliament, either in promoting a Bill of their own or in opposing the Glasgow Municipal Extension Bill; and the business of "paying the piper" has now to be faced. As the shareholders were taken into confidence by the Directors in reference to the parliamentary proceedings which they thought it proper to take in hand, it is not anticipated that there will be any opposition to the proposals which they have to submit to the annual meeting.

While speaking of the Partick, Hillhead, and Maryhill Gas Company's affairs, I may mention that very complete arrangements have been made for another year's work. Coals to the extent of about 14,000 tons have been purchased at something like an average cost of 12s. 6d. per ton, which is practically an advance of 4s. per ton on the prices at which the purchases were made a year ago. The coals selected, however, are of such a quality overhead that they will, it is calculated, give a yield of about 9800 cubic feet of gas per ton, whereas during the past year the yield has been, I believe, only about 9000 feet per ton. At the same time it may be mentioned that there are in stock or on order somewhere about 25,000 tons of coal the remnants of previous purchases.

At their monthly meeting held last Tuesday, the Greenock Gas Commissioners had before them a proposal from the Gas Committee (which had been carried by a majority of thirteen votes to three) to add £30 to the salary of Mr. Chalmers, Collector to the Gas Trust. A long discussion took place on the subject; but the recommendation was eventually carried by nineteen votes against five. Then came up the question of fixing the price of gas for the year 1890-91. The Gas Committee had had the subject under consideration on a recommendation from the Finance Sub-Committee to continue the price for another year at 3s. 4d. per 1000 cubic feet. Two amendments had been submitted in Committee—one to reduce the price 2½d. per 1000 cubic feet, to 3s. 1½d., and the other to bring it down to 3s. The discussion which arose on this matter was still longer than that on the salary question. Only the "2½d." amendment was submitted against the Gas Committee's recommendations; and when the division took place it was found that ten members were in favour of reducing the price to that extent, whereas fourteen recorded their votes against any reduction being made. In the course of the discussion, the Convener of the Gas Committee stated that the report by the Manager (Mr. Samuel Stewart) on the tenders for the supply of coals for the year 1890-91 showed that about 140,000 tons had been offered, or ten times as much as was wanted, and the offers included seventy different kinds of coal in twenty-nine tenders. The Convener further remarked that in consequence of reports of want of stock at the pits, it was expected that there would be some difficulty in getting coal during the winter months; and that in order to meet any difficulty that might arise on that score, the Committee had considered it advisable to spread the quantity required over as many offerers as possible. The quantity of coal in stock or on order out of last year's purchases is stated at 9000 tons; so that there will be available for the lighting season of 1890-91 a total of 23,000 tons of coal and shale. In order that gas managers elsewhere may see what mixture of coals Mr. Stewart has adopted so as to obtain the required yield of gas of the proper illuminating power, I subjoin the details of the purchases which he has just made, or which his Committee have approved of: Lanemark, 2000 tons; Linridge shale, 2000 tons; Westburn cannel, 1000 tons; Provanhall cannel, 1000 tons; Shields cannel, 1000 tons; Hillhouseridge cannel, 1000 tons; Parkhead cannel, 1000 tons; Barnclinth splint, 1000 tons; Meiklehill heading coal, 2000 tons; and Drumshangie, 2000 tons—total, 14,000 tons. I cannot say positively what the contract price is in each case; but, in the light of recent purchases for other gas concerns—companies and corporations—it may be taken that the rate of purchase is at the lowest half-a-crown advance on the average over the prices ruling a year ago for the same kinds of coal, thus making on the present purchases an increase of £1750 at the very least. The estimated expenditure on account of coals for the current year is set down at £12,300. The Convener of the Greenock Corporation Gas Committee is keeping his colleagues of the Town Council apprised of the fact that they may soon have to incur an expenditure of some £7000 or £8000 for an additional gasholder. This matter has been under the consideration of the Committee since last December; and it is not unlikely that a decision may have to be given upon it before the close of the present year.

There is a gas-supply concern on the Argyleshire side of the Firth of Clyde, known as the Cave and Kilcreggan Gas Company, whose charge for gas to ordinary consumers is 10s. per 1000 cubic feet. One of the places is a small police burgh. In consequence of the high price hitherto charged, the residents have in many cases given the gas the "go-by." Now, however, the Directors of the Company have offered to reduce the price to 5s. per 1000 feet on condition that the residents generally use it. Both Cave and Kilcreggan are watering-places; so there is not a large permanently resident population.

Prices in the Glasgow pig-iron market have this week had a decided spurt; but whether it is due alone to "bears" operating, or whether it is to be taken as indicative of a real and permanent improvement, remains yet to be seen. At the beginning of the week Scotch iron was quoted at 48s. 5d. per ton cash; and on Thursday the price had advanced to 50s. 3d. per ton. Saturday, however, as warrants became more plentiful, the price went easier; but again the market was strong at the close, when buyers were offering 49s. 10d. per ton.

No material change has taken place during the week in the local coal trade. Prices have remained almost stationary. Splints are moving off at 9s. 3d. to 10s. per ton; and steam coals are quoted at 11s. 6d. per ton f.o.b. at Glasgow shipping cranes. Best household coal is selling at 10s. 6d., and second qualities are about 1s. less per ton.

A report on the state of the local sulphate of ammonia market for the past week says: "We have again to report a firm market for sulphate of ammonia. Large lots have been shipped from Glasgow—about 1000 tons this week alone—and the market is almost completely cleared of stocks. £11 11s. 3d. per ton has been paid f.o.b. Leith, and £11 15s. f.o.b. Glasgow, prompt shipment. There are buyers at £11 12s. 6d. for October to March, but no sellers."

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Aug.* 23.

Sulphate of Ammonia.—There is a falling off in the American demand; but a fair amount of orders keep coming in from the other consuming quarters, and the present production is therefore readily disposed of. Prices are, if anything, a little stiffer, up to £11 15s. having been realized both at Hull and Liverpool, while Leith is again quoted at £11 10s. There is a stronger inclination to secure forward contracts; and full prices have been accorded for delivery up to the end of the year—an indication which seems to foreshadow a maintenance of values in the months to come. A firm tone continues to prevail in the nitrate market.

LONDON, *Aug.* 23.

Sulphate of Ammonia.—There has been a slight falling off in the demand; but as stocks are low, there are no anxious sellers, and the price is maintained at £11 12s. 6d.

Tar Products.—The principal feature in this market is the continued firmness in benzols—90 per cent. being now worth 4s. 2d. per gallon; and 50 per cent., 3s. 1d. per gallon. Further important sales in anthracene are reported—"A" quality, at 1s. 4¼d.; and "B" quality, at 1s. 1d. Sellers are now holding for 1s. 5d. and 1s. 1¼d. Other articles remain unchanged, with the exception of pitch, which is decidedly strong at 27s. 6d. f.o.b. Tar contracts are being taken at 2d. per gallon.

The Quality of the Maidstone Gas.—We learn from our local reporter that the summons issued by the Maidstone Corporation against the Maidstone Gas Company for an alleged deficiency in the illuminating power of the gas has been withdrawn upon terms which have not been made public; but it is understood that the Corporation found themselves pursuing a wrong course, and had no power to order the prosecution in the way they did.

The Heywood Corporation Gas Coal Contracts.—At the last meeting for the Heywood Town Council, the Gas Committee recommended the acceptance of a tender of the Wigan Coal and Iron Company of 1000 tons of nuts and 5000 tons of cannel. Mr. Lawton, the Chairman of the Committee, stated that the price was about 2s. per ton more than the last contract—an increase which would make a great difference in the cost of gas during the present year; and the Council would have to take this into consideration when the balance-sheet was brought before them. The sales of gas during the past quarter were 263,000 cubic feet more than for the corresponding quarter of last year, which was 800,000 feet more than the corresponding quarter of 1888. The increase was principally in dwelling-houses and stoves.

The Thirlmere Water-Works.—Last Friday, the members of the Manchester Corporation visited Thirlmere, and had the opportunity of seeing how much advanced is the scheme for utilizing the waters of the lake for the benefit of Manchester and the district around. The visitors journeyed from Manchester on the afternoon of Thursday, and spent the night at Keswick. On Friday morning they were taken by coach to the northern end of Lake Thirlmere, a distance of about six miles. On arriving there the party very speedily gathered at the place where the embankment is in process of construction. After an address from Mr. Alderman Thompson, Alderman Sir John Harwood, the Chairman of the Water Committee, laid the foundation-stone of the embankment, and received from his colleagues on the Committee a handsome silver trowel in commemoration of the event. There are in reality two embankments to be made; one being only a short distance from the other. The water to be discharged from the lake into the River Greta will pass through a tunnel driven in the rock which lies between the two artificial embankments. By means of this tunnel, the water provided under the Act of Parliament as compensation to the river will be discharged. The first embankment will cross the present natural outlet of the lake, and will be about 100 yards long and 50 feet high. The second embankment will be 200 yards in length and some 40 feet in height at the loftiest point. The width in the deepest part will be about 40 feet; and along the whole of the top there will be a roadway 16 feet wide. The embankments will be formed of masonry concrete set in cement. At the conclusion of the ceremony, and after refreshments had been served, Mr. Mason, of the firm of Messrs. Morrison and Mason, contractors for a portion of the works, took advantage of the opportunity to present Sir John Harwood with a silver tankard. The company subsequently journeyed to Lancaster, where dinner was provided at the King's Arms Hotel. Among those present were Mr. G. H. Hill, the Engineer of the Thirlmere works; Mr. G. F. Deacon, Consulting Engineer to the Liverpool Corporation; and Mr. J. Parry, Engineer and Manager of the Rivington Water-Works of the Liverpool Corporation.

Bursting of a Reservoir at Oldham.—Early last Friday morning an accident occurred to a reservoir belonging to the Gladwick Spinning Co., of Oldham. It appears that the Company are now constructing a new reservoir abutting on to an old one; and that it was the dividing wall between the two which collapsed. The capacity of the old reservoir was 750,000 gallons. Beyond the flooding of two houses in the vicinity, no great damage was done.

The Oldham Corporation and the Lighting of Street-Lamps.—A question of some importance is under the consideration of the Local Boards in the Oldham districts. These bodies are disposed to challenge the right of the Corporation of Oldham to supply gas to the street-lamps and municipal buildings free of charge. A conference was recently held on the subject, at which representatives were present from the Crompton and Chadderton Boards and from the Failsworth Local Board. The latter were not empowered to pledge their authority to any course of action; but a resolution was passed, stating that it was desirable that proceedings should be taken for the purpose of ascertaining whether or not Oldham can supply gas gratuitously to the street-lamps within the borough and to the buildings in question.

Lock-Out at the Enfield Gas-Works.—The Directors of the Enfield Gas Company recently informed the men employed at their works at Ponder's End that instead of eight hours a day they would be required to work twelve, with an increase of 6d. a day in pay. The twelve-hour arrangement was in force until ten months ago, when a reduction of the hours to eight and an increase of pay from 4s. 6d. to 5s. per day were granted. The Directors wished to revert to the twelve-hour day, and offered to raise their wages from 5s. to 5s. 6d. The men refused these terms; and last Thursday they were paid a week's wages in lieu of notice, and discharged. The work is now being partially carried on by non-Union men. The old hands are locked out, and will be upheld by the Union in the stand they have made. The employees at the Small Arms Factory at Enfield are stated to be in sympathy with the men, and have promised them support.

The Lancashire Coal Trade.—Business during the past week was of a quiet and steady character; and in some quarters there was a slight hardening of prices for the better descriptions of round coal. House-fire coal still meets a ready sale, and the demand fully equals the output at present. Steam coal shows a falling off; but there is no actual reduction in rates from those current in the previous week. Several large contracts for gas coal have recently been secured; but prices are very irregular, and dependent upon circumstances readily understood. The following are the quotations at the pits: Best house coal from 11s. 6d. to 13s. per ton; seconds, from 10s. to 10s. 9d. to 11s. as an outside figure; commoner sorts, from 8s. 6d. to 9s.; burgy, 7s. 6d. to 8s.; and slack, from 5s. 6d. to 7s. Steam coal for delivery on the Mersey is obtainable at from 10s. to 10s. 6d. per ton. In some directions coke marks a slight advance; but it is only for the better descriptions.

Carlisle Gas and Water Department.—The accounts of the Carlisle Gas and Water Departments for the past twelve months have been published. The profits from the gas-works amounted to £6307 6s. 10d., as against £7596. During six months of the preceding year, the price of gas was 2s. 6d. per 1000 cubic feet, and during the other half year it was 2s. 3d.; whereas for the whole of the past year the price has been 2s. 3d. The profits from the water-works came to £4524, as against £4758 in the previous year. During the first half of 1888-9 the discount was at the rate of 2s. 6d. in the pound, and 3s. 4d. during the second; and during the whole of the past year, there has been a uniform discount of 3s. 4d. in the pound—a fact which chiefly accounts for the slight reduction in the profits. About £2500 of the gas profits were paid over in May to the city fund on account; and, of course, the remainder will be paid in due course. The water profits will be handed over to the Urban Sanitary Authority.

Benighted Villages.—At its last meeting the Billinge Local Board had under consideration the question of lighting the streets during the winter months. The Chairman (Mr. Heald), who introduced the matter, expressed the opinion that theirs was the only township in Lancashire which is not lighted in the winter; and said that wherever they went out of the village they found gas or some substitute for it. The only objection to the adoption of public lighting was that they had done without it so long, and could dispense with it a little longer. After some discussion on the respective merits of oil and electricity, it was decided to obtain an estimate for the electric light, on the condition that the estimate was supplied free of cost. At Ince, in the same neighbourhood, a discussion arose at the Local Board meeting on the question of lighting the street lamps. One member expressed opinion that the practice of leaving the lamps unlighted was disgraceful. The lamps should either be lighted or the lamp-pillars, which under the existing conditions were a source of danger, should be removed. It was decided to light the lamps every night for the present, pending a full consideration of the subject.

The Northern Coal Trade.—There is greater easiness in the coal trade of the North of England; the renewed working in the Welsh coal trade having diverted back part of the trade into that channel. Best Northumbrian steam coal still commands 13s. per ton free on board; and the collieries are well employed. Small steam coal is a little easier at 6s. 6d. per ton. In gas coal the inland demand is a little better, and the consumption at all the gas-works must now be expected to increase weekly for four months; so that it is probable that stocks of coal will be laid in as quickly as possible. The price asked for best Durham gas coal is generally from 11s. 6d. to 12s. per ton free on board; but it is known that the large contracts which have been in the market of late have been concluded at about 11s. per ton—an appreciable advance on the rates of the contracts these are replacing. The export demand for gas coals is rather less than it was. Household coal is very dull, and the price is weak. For bunker coal for steamships there is also less demand here, and the price is slightly lower. Manufacturing coal is dull. For blast-furnace coke the demand is easier, and the price has fallen to about 16s. 6d. per ton free on board in the Tyne. There is little change in the price of gas coke, but some of the users are attempting to obtain cheaper fuel. At one of the cement works, trials are being made of coal in place of coke; and at another an endeavour is being made to obtain gas coke from the southern seaports at a lower price.

The Richmond Well.—At the meeting of the Richmond Select Vestry last Tuesday, a long report was presented by the Water Supply Committee on the subject of the well which is now being sunk in the Terrace Gardens. It closed with a recommendation that application should be made to the Local Government Board for their sanction to a loan of a further sum of £2000, to enable the Vestry to continue the driving of the adits. The report was accompanied by others from Mr. W. Whitaker, Water Engineer of the Southampton Corporation, and Mr. W. B. Bryan, Engineer of the East London Water-Works Company, in which the prosecution of the work was advised. After some discussion, it was decided to make the application.

The Board of Trade and Railway Rates.—The Board of Trade have presented, in accordance with the provisions of the Railway and Canal Traffic Act, their reports upon the schedules of maximum rates applicable in respect of merchandise carried by the following English railways: The Great Northern, Great Eastern, Great Western, London and North-Western, London and South-Western, London and Brighton, Chatham and Dover, Midland, and South-Eastern Companies, and the companies connected with these railways. These nine reports were, on the morning of the prorogation of Parliament (the 18th inst.), ordered to be printed; but as regards the Scotch, Irish, and the remaining English companies, no reports had been presented to Parliament up to the time of the prorogation.

The Ince Local Board and the Wigan Gas Committee.—A dispute has arisen between the Wigan Corporation Gas Committee and the Ince Local Board as to the liability of the latter authority for the repair of the mains and public lamps in their district. The Gas Committee have decided to refer the matter to arbitration, and have selected their arbitrator in Mr. G. Heaton. On the part of the Ince Board there is a disposition to resent this procedure as intended to cause unnecessary and vexatious litigation. When the matter was under consideration at the last meeting, a member described the action of the Gas Committee as "a piece of officious officialdom;" and a little heat was displayed by other members. In the end, the matter was referred to a Committee, with power to seek legal assistance, and take any necessary steps in connection with it.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 442.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	16 Apr.	10½	Alliance & Dublin 10 p. c.	10	17–18	..	5 16 8
100,000	10	,,	7½	Do. 7 p. c.	10	12½–13½	..	5 11 1
300,000	100	1 July	5	Australian (Sydney) 5 % Deb.	100	107–109	..	4 11 9
100,000	20	30 May	8	Bahia, Limited	20	20–22	..	7 5 5
200,000	5	15 May	7½	Bombay, Limited	5	6⅞–7⅛	–⅛	5 3 5
40,000	5	,,	7½	Do. New	4	5–5⅛	..	5 9 1
380,000	Stck.	14 Aug.	12½	Brentford Consolidated	100	212–217*	..	5 12 11
125,000	,,	,,	9½	Do. New	100	155–160*	..	5 15 7
220,000	20	13 Mar.	11½‡	Brighton & Hove Original	20	40–42	..	5 9 6
320,000	20	28 Mar.	11½	British	20	43–45	..	5 0 0
50,000	10	13 Mar.	11	Bromley, Ordinary 10 p. c.	10	18–20	..	5 10 0
39,000	10	,,	8	Do. 7 p. c.	10	13–14	..	5 14 3
328,750	10	13 June	8	Buenos Ayres (New) Limited	10	12⅜–13½	..	5 18 6
200,000	100	1 July	6	Do. 6 p. c. Deb.	100	103–106	..	5 13 2
150,000	20	14 Aug.	8	Cagliari, Limited	20	25–27*	..	5 18 4
550,000	Stck.	16 Apr.	13½	Commercial, Old Stock	100	252–257	..	5 7 0
130,000	,,	,,	10½	Do. New do.	100	200–205	..	5 4 10
130,000	,,	27 June	4½	Do. 4½ p. c. Deb. do.	100	117–122	..	3 13 9
557,320	20	13 June	13	Continental Union, Limited	20	47–49	..	5 6 2
242,680	20	,,	13	Do. New '69 & '72	14	33–35	..	5 4 0
200,000	20	,,	10	Do. 7 p. c. Pref.	20	38–40	..	5 0 0
75,000	Stck.	28 Mar.	10	Crystal Palace District	100	195–205	..	4 17 7
234,060	10	16 July	—	European, Limited	10	16–20	..	—†
120,000	10	,,	—	Do. New	7½	—	..	—†
354,060	10	,,	—	Do. do.	5	—	..	—†
5,470,620	Stck.	14 Aug.	13	Gaslight & Coke, A, Ordinary	100	236–241*	+1	5 7 10
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	98–101*	..	3 19 3
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	250–255*	..	3 18 5
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	119–123*	..	4 1 3
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	177–182*	..	4 8 5
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	161–166*	..	4 4 4
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	250–255*	..	3 18 5
1,061,130	,,	13 June	4	Do. 4 p. c. Deb. Stk.	100	115–120	..	3 6 8
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	123–128	..	3 10 4
650,000	,,	,,	6	Do. 6 p. c. do.	100	163–168	..	3 11 5
3,800,000	Stck.	15 May	12	Imperial Continental	100	219–222	+1½	5 8 2
75,000	5	13 June	6	Malta & Mediterranean, Ltd.	5	5–5⅛	..	5 9 1
560,000	100	1 Apr.	5	Met. of Melbourne, 5 p. c. Deb.	100	112–114	..	4 7 9
541,920	20	13 June	6⅔	Monte Video, Limited	20	19–20	..	6 10 0
150,000	5	30 May	10	Oriental, Limited	5	9–9⅛	+⅛	5 5 3
60,000	5	28 Mar.	7	Ottoman, Limited	5	5⅛–6	..	5 16 8
166,870	10	16 July	4	Pará Limited	10	3½–4½	..	8 17 9
420,000	100	2 May	6	People's Gas of Chicago—1st Mtg. Bds.	100	98–102	..	5 17 8
500,000	100	2 Dec.	6	2nd Do.	100	95–100	..	6 0 0
150,000	10	16 Apr.	10	San Paulo, Limited	10	14–15	..	6 13 4
500,000	Stck.	27 Feb.	13½	South Metropolitan, A Stock	100	287–292	..	4 10 9
1,350,000	,,	,,	11½	Do. B do.	100	231–236	..	4 17 5
141,500	,,	,,	12	Do. C do.	100	240–250	..	4 16 0
650,000	,,	27 June	5	Do. 5 p. c. Deb. Stk.	100	140–145	..	3 9 0
60,000	5	27 Feb.	11½	Tottenham & Edm'nton, Orig.	5	11–13	..	4 8 5
				WATER COMPANIES.				
728,446	Stck.	13 June	9½	Chelsea, Ordinary	100	267–272	..	3 9 10
1,720,560	Stck.	16 Apr.	7½	East London, Ordinary	100	212–216	..	3 9 5
544,440	,,	27 June	4½	Do. 4½ p. c. Deb. Stk.	100	142–147	..	3 1 3
700,000	50	13 June	9	Grand Junction	50	121–125	..	3 12 0
708,000	Stck.	14 Aug.	10½	Kent	100	270–275*	..	3 16 4
1,043,800	100	27 June	9½	Lambeth, 10 p. c. max.	100	250–255	..	3 14 6
406,200	100	,,	7½	Do. 7½ p. c. max.	100	197–202	..	3 14 3
200,000	Stck.	28 Mar.	4	Do. 4 p. c. Deb. Stk.	100	122–126	..	3 3 2
500,000	100	14 Aug.	12½	New River, New Shares	100	361–366*	..	3 8 3
1,000,000	Stck.	31 July	4	Do. 4 p. c. Deb. Stk	100	125–128	..	3 2 6
902,300	Stck.	13 June	6	S'thwk & V'xhall, 10 p. c. max.	100	170–174	..	3 9 0
126,500	100	,,	6	Do. 7½ p. c. do.	100	158–163	..	3 13 7
1,155,066	Stck	13 June	10	West Middlesex	100	265–270	..	3 14 1

*Ex. div.

† New reconstruction of capital affords no data at present.
‡ Next dividend will be at this rate.

The Water Supply of Featherstone and Normanton.—Last Wednesday week a supply of water obtained from the Corporation of Wakefield was formally turned on for the use of the residents in the Featherstone Local Board's district. Wakefield water is now also being received into the Normanton Local Board's reservoir, and used throughout the district; the connection for the present being through the main of the Altofts Local Board.

The Public Lighting of Westminster.—In the annual report of the Vestry of the parishes of St. Margaret and St. John, Westminster, it is stated that the system of street lighting—including the cost of repairing the 1381 gas columns and lanterns, the periodical painting and cleaning, lighting and extinguishing, and the supply of gas—has been carried out at a cost of £4767; the entire service being executed by The Gaslight and Coke Company. In Parliament Square, 21 lamps are supplied, lighted, and maintained by Her Majesty's Office of Works, to whom £60, included in the above amount, was paid by the Vestry under a special arrangement.

Accident to a Gas-Main at Leicester.—A serious mishap occurred last Saturday evening week in the gas supply to the Post Office at Leicester. Owing to subsidences caused by recent sewer works, the pipe supplying the Post Office became disconnected with the main; and the gas escaped in large volumes. It found its way into the sewer; and travelling along it and up the drains entered in various business establishments in the neighbourhood. The Gas Engineer (Mr. A. Colson) was communicated with; and he immediately made a personal inspection. By his direction the windows of the houses were thrown open, and the doors locked where necessary to prevent the ingress of persons with lights. By these means there is no doubt that a serious accident was averted. A gang of men were promptly set to work, and temporary repairs were completed by three o'clock on Sunday morning. At daylight on Monday, the men were at work again; and by six o'clock everything had been made secure. Various street lamps were turned out on Saturday night; but this was owing to the amount of gas that was escaping up the columns.

Ridsdale's Railway Lamp and Lighting Company.—A petition by the Official Liquidator of this Company, asking the sanction of the Court to a scheme of arrangement, under which the whole of the assets shall be transferred to a new Company, came before Mr. Justice Lawrence last Wednesday. Mr. Marten, Q.C., appeared for the Official Liquidator, and stated the scheme, under which debenture-holders, who have obtained judgment for £9000 and upwards, are to receive preference shares in the new Company, and the present shareholders are to receive ordinary shares at the rate of one share for every ten now held. The Liquidator's affidavit stated that if the debenture-holders exercised their rights, they would sweep away the whole assets; but they had consented to this scheme. Meetings had been held at which it had been approved almost unanimously. Mr. Carson, for the debenture-holders, supported the application. Counsel for several shareholders asked that the matter might be adjourned for a week in order that they might put their views before the Court; and one shareholder, appearing in person, made the same request and suggested that there was some question as to the validity of the debentures, which he submitted was evident by the debenture-holders agreeing to this compromise, and giving the shareholders anything. Mr. Marten pointed out that the debenture-holders had already obtained judgment. His Lordship said he saw no object to be gained by delaying the matter; and therefore he sanctioned the scheme.

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM LONDON." TELEPHONE No. 2698.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS,

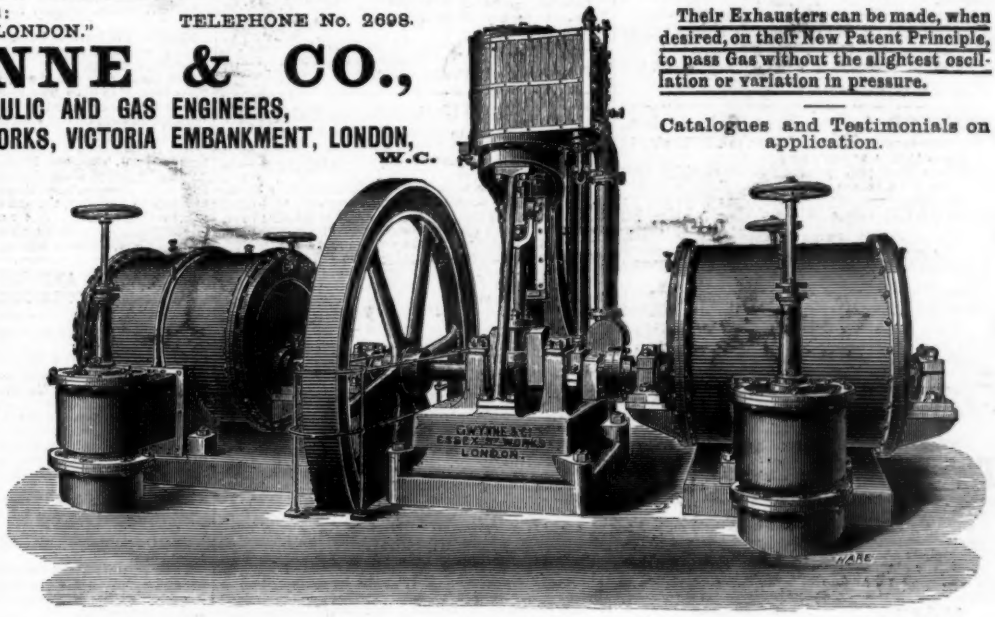
ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C.

Thirty-three Medals at all the Great International Exhibitions have been awarded to GWYNNE & Co. for Gas Exhausters, &c.

They have completed Exhausters to the extent of 29,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH-SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle, to pass Gas without the slightest oscillation or variation in pressure.

Catalogues and Testimonials on application.

Exhausting Machinery at Fulham and Bromley Gas-Works—each set passing 400,000 cub. ft. per hour, drawing 14 miles distant from Beckton.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAYS.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

CANNEL COAL, ETC.

JOHN ROMANS & SON, EDINBURGH.
Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / NEWTON GRANGE, NEAR DALKEITH, } SCOTLAND.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

BENTLEY & CO.

MANCHESTER ELECTRICAL STORES.

FOR Batteries, Bells, Wires, and Special Electrical Apparatus, address the best house 17, NEWTON STREET, PICCADILLY, MANCHESTER.

JAMES LAWRIE & CO. supply Best SCOTCH CANNEL COALS, Best FIRE-CLAY RETORTS, BRICKS, TILES, and LUMPS; BOILER SEATING BLOCKS, FLUE COVERS, and SILICA BRICKS for SPECIAL FURNACE WORK; COKE BARROWS, BOGIES, and SMALL WAGONS.
Postal Address: 1, WHITTINGTON AVENUE, E.C.
Telegram Address: "EIRWAL LONDON."

W. C. HOLMES & Co., Huddersfield, AND 80, CANNON STREET, LONDON,
Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.
*** See Advertisement p. 884 of last week's issue.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for Wet and Dry Gas-Meters, Station Meters, and Governors, Pressure-Gauges, Street Lamps, and Pillars, &c.
Telegraphic Address: "Braddock, Oldham."

SULPHURIC ACID delivered in Manufacturers' Tanks or Carboys.
Prices on application to HARDMAN and Co., Miles Platting, MANCHESTER.

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. Spent Oxide and Sulphate of Ammonia purchased.
120 and 121, NEWGATE STREET, LONDON, E.C.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

COZE'S Automatic Apparatus for CHARGING AND DISCHARGING GAS-RETORTS. For Illustrated Advertisement of this System, see p. 470.
Inquiries should be addressed to THE AUTOMATIC COAL-GAS COMPANY, LIMITED, 86-88A, LEADENHALL STREET, E.C.

EXTRACT from the Harrogate Gas Company's Report, dated the 5th of February, 1890: Coal consumed, 8600 tons. Gas made, 92,880,000 feet; ditto sold, 84,880,000 feet; ditto unaccounted for, 8,000,000 feet; quantity made per ton, 10,800 feet; ditto sold, 9869 feet. Illuminating Power, 16·1 candles. Coals used, Brancepeth. Owners, Strakers and Love, Newcastle-on-Tyne; who have also Brandon Hulton Seam Unscreened Gas Coal. Analysis, 10,500 cubic feet per ton; Illuminating Power, 16·2 candles.

ADVERTISER (aged 32) desires an appointment as MANAGER of medium-sized Works, Assistant of large, or Superintendent of Distribution Department. Well up in the Manufacture, Purification, and Distribution of Gas, and a practical acquaintance with all modern Gas Apparatus, both for Lighting and Heating. Fair Chemist. Highest references.

Address No. 1850, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by experienced (London) Man, a Situation as SUPERINTENDENT or GENERAL FOREMAN of Works. Has had first-class official experience. Exceedingly well trained in Carbonizing and Purification. Age 35. Married; no family. An abstainer. Excellent testimonials.

Address No. 1851, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MANAGER (Working) Wanted, for small Works in the Country. Annual make, 2½ to 3 millions. A thoroughly competent person required. Wages, £1 5s. per week. Good House, Coal, Gas, and Water free.

Applications, with testimonials, to be sent not later than the 2nd prox., to the SECRETARY, Gas Company, STOW-ON-THE-WOLD.

STOKER wanted, during the Winter for Night work. Will be required to Light and Extinguish Lamps, and make himself useful. Wages £1 per week.

Apply to WM. ALLEN, Secretary, Gas Company, New Romney, KENT.

WANTED, immediately, a sober, steady Man as STOKER. Constant employment to a suitable Man.

Apply to J. P. POOLE, Gas-Works, Sutton and Hooton, CHESHIRE.

WANTED, a Man to take sole charge of small Gas-Works. One able to do plain Fitting preferred. Wages, £1 per week. House, Coal, and Light.

Apply to C. W. GRIMWOOD, Sudbury, SUFFOLK.

WANTED, to purchase Gas Carbon, delivered at nearest Station to Gas-Works, in quantities of not less than 4 tons.

Address, stating price per ton and quantity, No. 1766, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—One Single Gasholder, 80 feet by 20 feet (owing to extensions at Blackpool). To be erected complete; in first-rate condition.

Apply to CLAYTON, SON, AND CO., LIMITED, Hunslet, LEEDS.

FOR SALE—20 Fully-Paid £10 Shares in the Gas-Meter Company, Limited, for £18 per share.

Apply, by letter, to A. M. WAKEFORD, 38, Hart Street, BLOOMSBURY, W.C.

COUNTY BOROUGH OF WIGAN.

TO TAR DISTILLERS AND OTHERS.

THE Gas Department of the Wigan Corporation invite TENDERS for TAR for One year, commencing on the 1st of September, 1890, and terminating on the 31st of August, 1891.

Particulars and form of tender may be obtained on application to the undersigned.

The highest tender not necessarily accepted.

Tenders, sealed, and endorsed "Tar," to be addressed and delivered to A. Smith, Esq., Town Clerk, on or before the 15th of September next ensuing.

JOS. TIMMINS,
Engineer, &c.

Borough Gas-Works, Wigan,
Aug. 20, 1890.

THE Hornsey Gas Company have for SALE Two Cast-Iron TOWER SCRUBBERS—one 7 ft. 6 in. diameter by 30 feet high, and the other 10 feet diameter by 40 feet high—in good condition.

Full particulars can be obtained at the GAS-WORKS, Clarendon Road, HORNSEY, N.

BRIDGNORTH CORPORATION GAS-WORKS.

TENDERS FOR SURPLUS TAR.

THE Gas Committee hereby invite TENDERS for the purchase of the surplus TAR (about 100 tons) produced at these Works during One year from the commencement of the contract.

The Tar will be delivered on Rails at Bridgnorth Station in the Contractor's tanks.

Sealed and endorsed tenders to be sent to the undersigned not later than the 30th inst.

Neither the highest nor any tender will necessarily be accepted.

By order,
J. H. COOKSEY, Town Clerk,
Secretary.

Bridgnorth, Aug. 22, 1890.

CITY OF BELFAST.

CONTRACT FOR COAL.

THE Gas Committee of the Belfast Cor- poration invite TENDERS for a supply of 100,000 tons of Best Screened GAS COAL, and 6000 tons of High-Class CANNEL, to be delivered free and trimmed in Barges at Belfast Harbour, between Nov. 1, 1890, and Oct. 31, 1891.

No tender for less than 10,000 tons of Coal will be considered.

Monthly quantities and particulars may be obtained from the Manager of the Gas-Works.

Tenders, endorsed "Tender for Coal," should be delivered in my Office not later than the 2nd of September.

The lowest or any tender not necessarily accepted.

SAMUEL BLACK, Town Clerk.

Town Hall, Belfast, Aug. 14, 1890.

THE Sheffield United Gaslight Company are prepared to receive TENDERS for the construction of an IRON ROOF, about 160 feet long by 52 feet wide, to cover a portion of the Coal Sidings at their Neepsend Station.

Forms of tender, with bill of quantities, may be obtained, and the drawings may be seen, on and after Monday, the 25th inst., upon application to the Engineer, at the Company's Offices, Commercial Street, Sheffield, and sealed tenders must be delivered to the undersigned on or before Wednesday, the 3rd day of September next.

The Directors do not bind themselves to accept the lowest or any tender.

HANBURY THOMAS,
General Manager

Aug. 16, 1890.

TO TAR DISTILLERS, ETC.

THE Directors of the Sheffield United Gaslight Company are prepared to receive TENDERS for the purchase of the surplus TAR made at their Neepsend and Effingham Street Works, for the period of Twelve months, ending Aug. 31, 1891.

The quantities will be, approximately: Neepsend, 6500 tons; Effingham Street, 1500 tons.

At Neepsend the Tar will be loaded into Tanks on the Company's Siding, on the Manchester, Sheffield, and Lincolnshire Railway, or into Barrel-Carts on the Works; and at Effingham Street into Barrel-Carts only.

Forms of tender and conditions of contract may be obtained from the undersigned, to whom tenders, endorsed "Tender for Tar," must be delivered on or before Wednesday, Sept. 3.

The Directors do not bind themselves to accept the highest or any tender.

HANBURY THOMAS, General Manager.

Commercial Street, Sheffield, Aug. 16, 1890.

NEW ROMNEY GASLIGHT AND COKE COMPANY, LIMITED.

THE Directors are prepared to receive TENDERS for about 400 tons of Screened LONDONDERRY, NEW PELTON, PELAW MAIN, or SILKSTONE COAL for Twelve months from the 1st day of September next, in such quantities and at such times as the Directors may think fit.

Price of coal to be given free to New Romney Station; and also price delivered on the Strand at Littlestone by ship.

Tenders to be sent in not later than the 10th of September next, marked "Tender for Coal."

WM. ALLEN, Secretary.

Gas-Works, New Romney, Kent.

TENDERS FOR GAS COAL.

THE Corporation of Droitwich invite TENDERS for the supply of 400 to 700 tons of best screened GAS COAL, at per ton of 21 cwt., to be delivered free at Droitwich (G. W.) Railway Station at such times and in such quantities as may be required.

The Contract will be for the period ending the 30th of April, 1891.

Tenders (with analysis of the Coal to be supplied), properly endorsed "Tender for Gas Coal," to be sent to the undersigned on or before Wednesday, the 3rd of September.

The Corporation do not bind themselves to accept the lowest or any tender.

S. JOHN TOMBS, Town Clerk.

Droitwich, Aug. 15, 1890.

TO TAR DISTILLERS AND MANUFACTURING CHEMISTS.

THE Windsor Royal Gaslight Company are prepared to receive TENDERS for the purchase of their surplus COAL TAR and AMMONIACAL LIQUOR (10-oz. Liquor) for One year, from Sept. 30, 1890.

The Tar will have to be removed in barrels; but the Liquor can be pumped into railway tanks on the Great Western Railway.

The Contractor must be prepared to keep the Company cleared of both Tar and Liquor, and to provide all the necessary barrels for the purpose.

The Directors do not bind themselves to accept the highest or any tender.

Any further information may be obtained on application to Mr. J. Wadeson, Manager.

Sealed tenders, stating price at the Company's Works free of all charges, must be sent in by Twelve o'clock at Noon on Tuesday, the 2nd day of September, 1890.

By order,
JOHN HENRY STRANGE, Secretary.

Gas Offices, Victoria Street, Windsor.

WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.

TENDERS FOR COAL.

THE Directors of the Wandsworth and Putney Gaslight and Coke Company are prepared to receive TENDERS for the supply of 40,000 tons of clean, dry, unscreened, fresh-wrought GAS COALS, delivered in covered Barges alongside the Company's Works at Wandsworth in the River Thames.

The Coal to be delivered from time to time in quantities as required by the Company's Engineer, and to extend over Twelve months ensuing, from or about the end of September.

Payment by Cash monthly.

Other particulars can be obtained on application to the Company's Engineer.

The Directors do not bind themselves to accept the lowest or any tender.

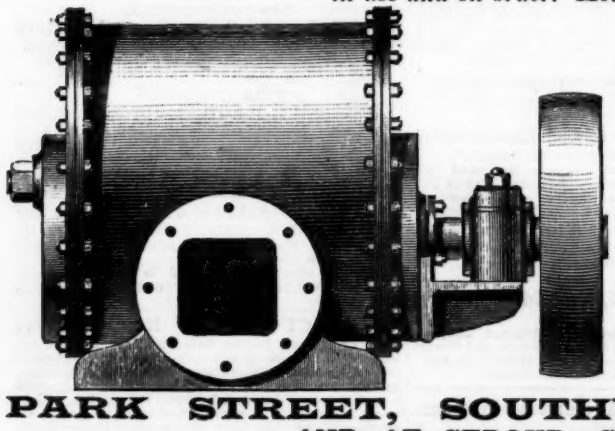
Tenders, sealed, and endorsed "Tender for Coals," to be addressed to the Chairman of the Company, and delivered at the Company's Offices not later than the 15th of September.

By order,
WALTER CROMARTY, Secretary.

North Street, Wandsworth, S.W.

G. WALLER & CO.'S
PATENT FOUR AND THREE BLADE GAS EXHAUSTERS.

With or without Engine combined. To pass up to 300,000 cubic feet per hour. Nearly 200 in use and on order. Model sent for inspection.



SPECIAL ADVANTAGES.

1. It gives a more **steady gauge** at all speeds than any other Exhauster.
2. It will deliver fully **one-third more** per revolution than the Beale Exhauster.
3. It has not any **Segments or Rings** to cause friction.
4. The Cylinder being a **circle** and the blades **radial from the centre,** it can be driven at a higher speed than any other Exhauster.
5. No **heavy Fly-Wheel** needed; and **one-third less** power required.
6. The **only system** by which Exhausters **can be altered** to pass from **30 to 40 per cent.** more with same Driving Gear and Connections.

Oldest Makers of BEALE'S EXHAUSTERS for 300 Works.

SPECIALITY—Elevating and Conveying Machinery for Coal, Coke, Oxide, Lime, &c.

PARK STREET, SOUTHWARK, LONDON, S.E.,
AND AT STROUD, GLOUCESTERSHIRE.

HOLMSIDE GAS COALS.

THE Owners of Holmside and South Moor Collieries possess an undivided area of nearly 5000 acres of COAL in the County of Durham, over the greater portion of which area the most of the best Coal of the district, including the well-known Hutton Seam, remains almost untouched; and as preparations are being made for working the Hutton Seam on a large scale, it is expected that the reputation of HOLMSIDE GAS COALS will be still further increased. The Holmside and South Moor Collieries have been in the hands of the same families for over half a century; but, until lately, no adequate attempt has been made to open out their very large Coal-Field, notwithstanding that the best Coal of the district around them, and especially the Hutton Seam, has been for some time past seriously diminished by reason of the vigorous workings of neighbouring coal-owners. Holmside Gas Coals are now being worked out of Holmside and South Moor Collieries at a rate of about 2200 tons per working day—a rate totally inadequate to meet the existing demand. By an extensive development of workings in the Hutton Seam, it is hoped that the demand may be fully met, and the quality raised to the highest point attainable by Durham Coal.

For price and particulars, apply to MARK ARCHER, Holmside and South Moor Offices, Quayside, NEWCASTLE-ON-TYNE.

GREAT WIGSTON GAS COMPANY.

TO TAR DISTILLERS, ETC.

THE Directors of the above Company invite TENDERS for the surplus TAR produced at their Works for One year, ending Sept. 30, 1891 (coal carbonized about 1600 tons), delivered into Tanks on the Midland Railway, or Boats on the Old Union Canal, at Thilby Bridge.

Offers to be at per ton of 200 gallons.

Payments monthly.

Tenders to be addressed to JOHN A. HARRIS, Manager, by Aug. 31.

GAS TAR.

THE Widnes Local Board invite Ten- ders for the purchase of about 650 tons of GAS TAR from their Gas-Works, for the Twelve months ending Sept. 30, 1891.

Form of tender and conditions of contract may be obtained from Mr. Carr, Gas-Works, Widnes.

Tenders, endorsed "Tar," to be delivered to the undersigned not later than the 30th inst.

The Board do not bind themselves to accept the highest or any tender.

JAS. T. ALLEN, Clerk.

Town Hall, Widnes,
Aug. 13, 1890.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the ANNUAL ORDINARY GENERAL MEETING of the Proprietors in this Company will be held at the Company's Offices, Willoughby Lane, Tottenham, on Saturday, the 30th day of August inst., at Three o'clock in the Afternoon precisely, to receive the Report of the Directors, the Statement of Accounts for the Half Year ended the 30th of June, 1890, to declare Dividends for the same period, for the Election of Two Directors and an Auditor for the ensuing year, and for transacting such other business as the Act of Parliament directs.

The Transfer Books will be closed from the 15th to the 30th day of August, both days inclusive.

By order of the Board,
JAMES RANDALL, Secretary.

Offices of the Company:
Willoughby Lane, Tottenham,
Aug. 15, 1890.

ROCHESTER, CHATHAM, AND STROOD GAS-LIGHT COMPANY.

SUPPLY OF COAL.

THE Directors of the above Company invite TENDERS for the supply of 29,300 tons of GAS COAL, to be delivered between the 16th of September prox. and the 30th of June, 1891.

Particulars and form of contract may be had on application to

WILLIAM SYMS,
Secretary and Manager.

Gas Office: 58, High Street,
Rochester, Aug. 9, 1890.

CRYSTAL PALACE DISTRICT GAS COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Albion Tavern, Aldersgate Street, on Friday, the 12th day of September, 1890, to receive the Report of the Directors, the Balance-Sheet examined and signed by the Auditors, to elect an Auditor in lieu of Mr. Alfred Thos. Layton, to declare a Dividend, and for General Purposes.

The chair to be taken at Three o'clock precisely.

By order of the Board,
MAGNUS OHREN, Secretary.

Aug. 15, 1890.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Bell Hotel, Bromley, Kent, on Thursday, the 28th day of August inst., at Six o'clock precisely, to receive the Report of the Directors, the Balance-Sheet confirmed by the Auditors, to declare a Dividend, and for General Business.

The Transfer Books will be closed from the 15th to the 28th of August, 1890, both days inclusive.

By order of the Board,
HENRY W. AMOS, Secretary.

Offices: At the Works, Bromley,
Kent, Aug. 13, 1890.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Inventions may be secured for Twelve months; or LETTERS PATENT which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

Price 2s. per dozen, or 10s. 6d. per 100, post free.

CONSPIRACY and Protection of Pro- perty Act. It is required, under a Penalty of FIVE POUNDS, that a Printed Copy of the 4th Section of this Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat.

Printed copies of this Section, in large type, on broad sheets, may be obtained of WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

*** *The Act extends to Scotland and Ireland.*

Fcap. 4to, Cloth, Gilt Lettered, numerous Illustrations, price 7s. 6d., post free.

Practical Photometry:

A GUIDE TO THE STUDY OF THE

MEASUREMENT OF LIGHT.

By William Joseph Dibdin, F.I.C., F.C.S.,

Chemist and Superintending Gas Examiner to the London County Council.

London: WALTER KING, 11, Bolt Court, FLEET ST., E.C.

Price 6s., Cloth Bound, Bevelled Boards,

THE

GUIDE-FRAMING OF GASHOLDERS

AND OTHER PAPERS

CHIEFLY RELATING TO

STRAINS IN STRUCTURES CONNECTED WITH GAS-WORKS.

BY

F. SOUTHWELL CRIPPS, Assoc. M. Inst. C.E.

Reprinted from the JOURNAL OF GAS LIGHTING, *Fully Revised and Corrected by the Author, with many Additions.*

LONDON:
WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

PREPARED OXIDE OF IRON

FOR PURIFYING COAL GAS.

As extensively used in Yorkshire, Lancashire, the Midlands, and Abroad.

Manufacturers: BAILES & HALLSWORTH,

Armley, Leeds, & at Bradford, Manchester.

G. E. TOURNAY,

Contractor for the Erection and Re-Building of

GAS-RETORT SETTINGS,
CHIMNEY SHAFTS,
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THANNINGTON, CANTERBURY.

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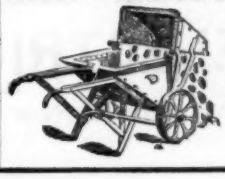

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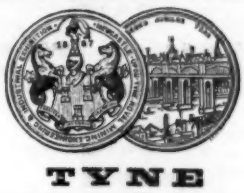

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Weight of illuminating power in pounds of sperm, 820·80. Very free from impurities.

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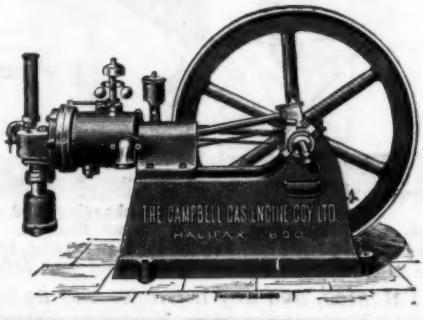

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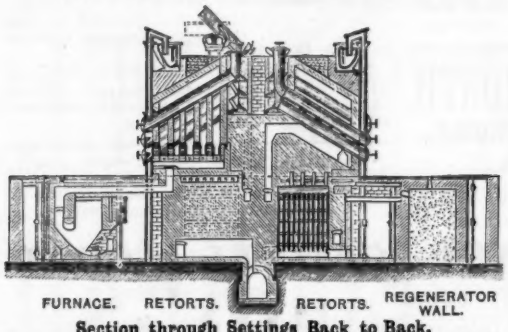
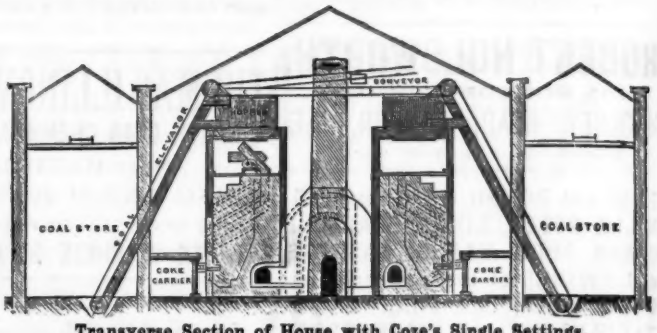
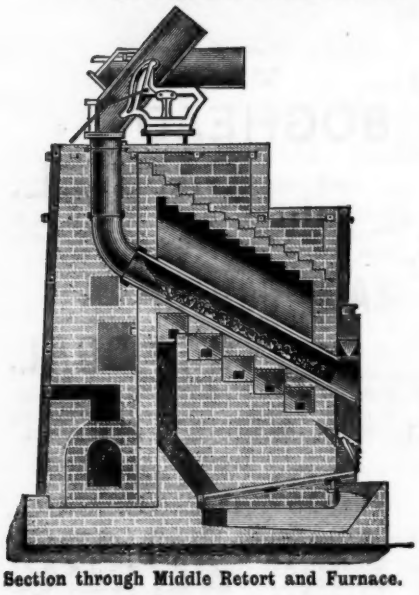
This System of Automatically Charging and Discharging Retorts without machinery or arduous labour is in operation at several places on the Continent and in America, and will shortly be at work in various Gas-Works in England.



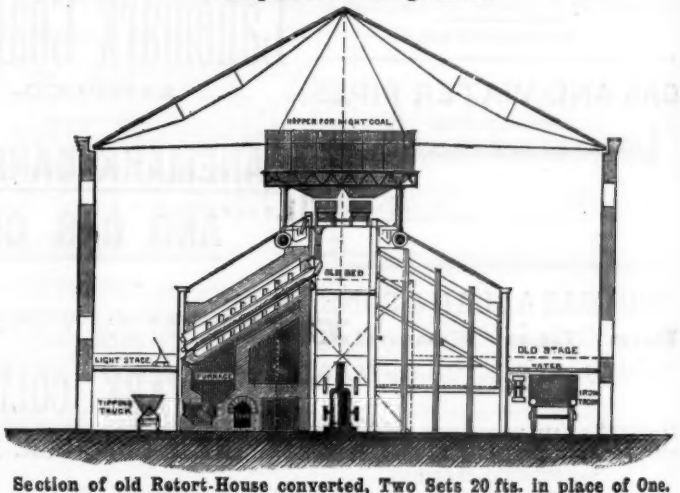
Section through Settings Back to Back.
Working off ground floor with Generator under Stage and Regenerator under the Sets.



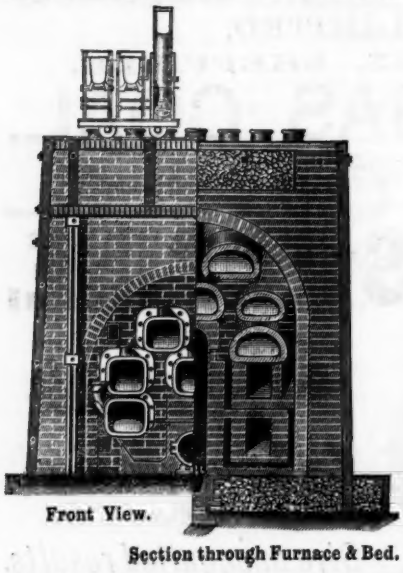
Transverse Section of House with Coze's Single Settings,
Showing Method of working Two Single Settings and Distributing the Coal to the Supply Hoppers; the whole of the work being Automatic.
This plan is for a large House.



Section through Middle Retort and Furnace.

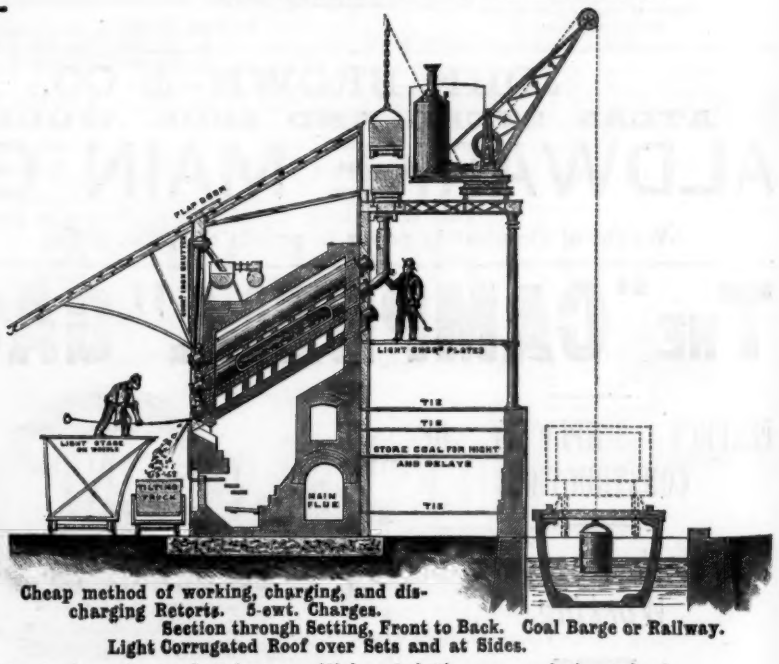


Section of old Retort-House converted, Two Sets 20 fts. in place of One.
Modified form, with ordinary Retorts and Fittings.



Front View.

Section through Furnace & Bed.



Cheap method of working, charging, and discharging Retorts. 5-cwt. Charges.
Section through Setting, Front to Back. Coal Barge or Railway.
Light Corrugated Roof over Sets and at Sides.

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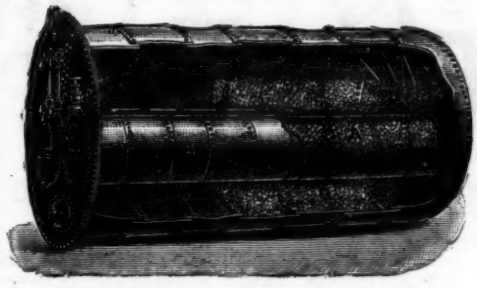
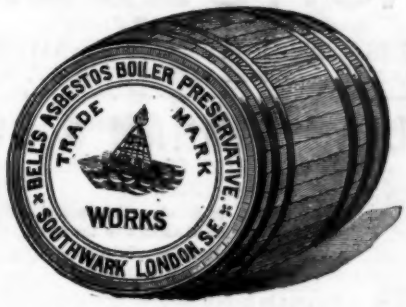
Will remove Incrustation from Steam-Boilers of all kinds without chipping.



A shows Boiler Plates when incrusted.
B shows Boiler Plates when cleaned by this Composition.



Every Cask is sent out as above.

The action of this **BOILER PRESERVATIVE,** by absorbing the free oxygen that is in the water, **entirely checks pitting and corrosion.** It also disintegrates incrustation so immediately as to prevent its adhering to the plates; and the deposit falls to the bottom in a loose powder, which is easily swept out. By keeping boilers clean, a **great economy of fuel is effected,** and the danger of the plates burning is entirely obviated; thus avoiding the great risks which are inseparable from scaled plates, lengthening the life of a boiler, and **covering its own cost a hundredfold.** Whenever possible it should be used through Feed Pump or Injector, which it will also keep clear from incrustation. The small quantity required to effect its purpose makes this the most economical, and more than repays the higher price we charge for a fluid which, in the case of many other makers, is useless.

QUANTITY REQUIRED A quarter of a pint weekly per horse power indicated; where the water is very bad rather more, or one pint for every 700 gallons of water evaporated.

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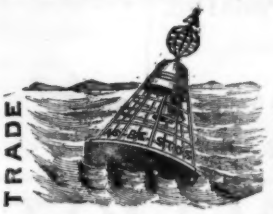

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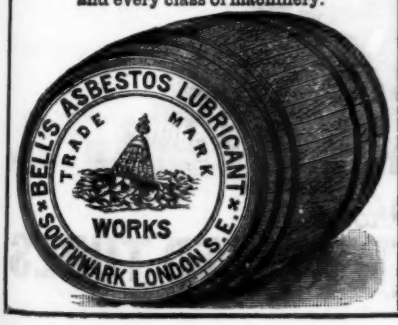

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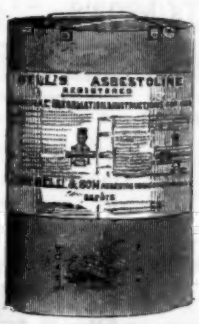

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RINGS, AND TAPE.
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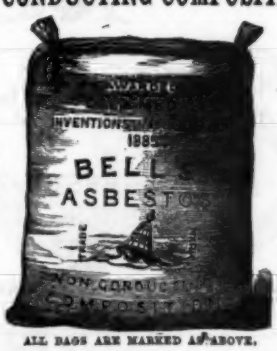
Will reduce loss by radiation and saves 40 per cent. of fuel.
Is superior to any other, and saves its cost in a few months.



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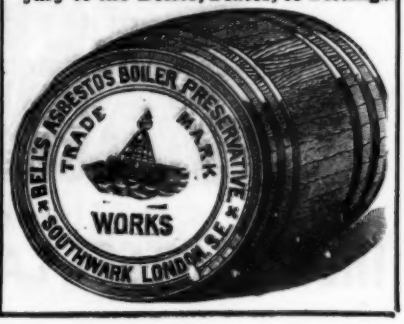
Will effectually keep Boilers clean, and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



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CAST-IRON RETORTS
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SOCKET-PIPES FOR GAS OR WATER PURPOSES.
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NEW HIGH-POWER GAS-LAMP.
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Gas Companies should hire these Lamps to their Consumers, and introduce them for Street Lighting as a rival to the Electric Light, as they do not get out of order, are most economical, and the Burner being a circular slit does not choke up.

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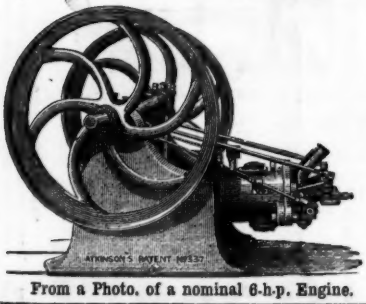

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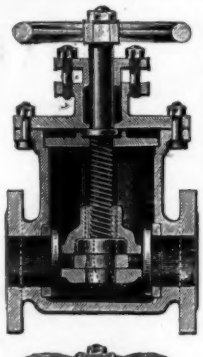

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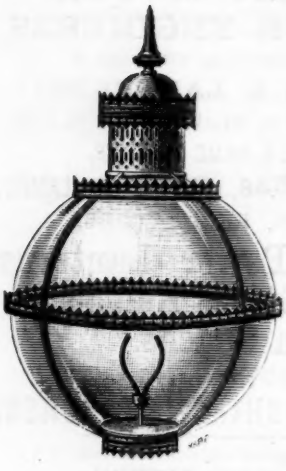

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[See also Advt., p. 438.

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